



IMV CORPORATION

CardVibro NeoTM

for Pocket PC

Model : VM-2004Neo

Card-type Portable Vibration Meter

User Manual

User Manual Part No. TVE-6-3224

Web Site: imv.co.jp

Thank you for purchasing IMV's **CardVibro Neo** portable vibration meter.

Never fail to read **Safety Practices** in this User manual for the safety operation.

Read User manual for Pocket PC before using the CardVibro Neo, master the basic operation method and do the initial setup, then prepare to operate the CardVibro Neo.

The following topics are described in this User Manual:

- How to use the CardVibro Neo
- Vibration Measuring Methods
 - This user manual is written assuming you have mastered the basic operations of the Pocket PC unit. Refer to the Pocket PC user manual for more information. As for the detail of ActiveSync (application for PC to transfer the data between Pocket PC and PC), install the accessory CD-ROM for ActiveSync and see [Help] of ActiveSync.

Contact your IMV Service Representative if you have questions about this user manual.

- Keep this User Manual with the CardVibro Neo unit.
- The copying of software and documentation is prohibited by the Copyright Act.
- The rental of software is prohibited by the Copyright Act.
- IMV is not responsible for damage, profit loss, or any other claims from third parties or use of accessory software.
- The contents saved in Memory(Built-in memory, Memory card etc.) of Pocket PC is out of our warranty irrespective of the cause of fault and trouble.
- It is recommended to take backup of the saved contents periodically.
- Accessory software is not available for units other than the VM-2004Neo CardVibro Neo.
- This unit and software may be changed without notice.
 - Microsoft, ActiveSync, Windows logo, and Pocket ACCESS are registered trademarks of Microsoft Corporation in USA. or sister company.
 - The formal name of Windows is Microsoft Windows Operating System.
 - Compact Flash Card is described CF Card in this User Manual.

The system name and product names shown in the User Manual are registered trademarks of the manufacturer.

Observe the following safety practices when using the CardVibro Neo:

- When measuring a hot machine or near a rotating shaft or moving components, if possible, attach the vibration sensor with the machine stopped, then start the machine, bring it up to nominal speed, and perform the measurement. If you must measure in dangerous conditions, be careful not to burn or catch yourself or the CardVibro Neo cable in rotating machine components.
- Do not allow water or foreign material to enter the CardVibro Neo unit. If water does enter the unit, switch off the unit immediately and call your IMV Service Representative.
- If the CardVibro Neo is not operating properly, contact your IMV Service Representative for troubleshooting assistance.
- Do not open the cover. If the CardVibro Neo's outer cover is opened or modified, it may cause serious damage. Contact your IMV Service Representative for inspection and repairs.
- Use the specified sensor cable only. The use of any other cable may cause damage to the CardVibro Neo unit.
- Ensure the CardVibro Neo connector is attached to the Pocket PC properly.
- Do not allow metal chips to enter the connector area, else a short circuit may occur between the pins and present a fire hazard.
- Insert the CardVibro Neo straight into the Pocket PC unit when connecting. If the connector is misaligned when inserted, it may cause a short circuit and present a fire hazard.

Table of Contents

Introduction	1
Overview	1
Preparation	3
View of the CardVibro Neo.....	3
Booting up the CardVibro Neo.....	7
Sensor / Sensitivity Setting.....	9
Other General Setup Procedures.....	9
General Operation	10
Main Menu	10
Using the Vibration Pickup.....	12
Overall Vibration Measurements.....	14
Judgment of Vibration Level	21
FFT / WV Analysis.....	32
How to use the PU OUT connector	54
Notes.....	55
Using the Utilities Menu.....	58
Sensor	61
Memory	64
Edit Hierarchy.....	66
Save Data.....	73
Accel fmax.....	76
Database.....	78
Units	80
Dictionary	81
Version.....	82
About Installation of CardVibro Neo	83
Troubleshooting	85
Troubleshooting.....	85
Specifications	86
General Specification.....	86
Measurement Specifications	89
Other Product Information.....	104

Introduction

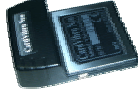
Overview

The IMV CardVibro Neo is a portable vibration meter expansion module that fits into a Pocket PC's CF card slot (Type II).

Features

- Conforms to the CF card expansion slot (Type II)
 - Highly expandable
 - Versatile – Provides vibration measurements and all other Pocket PC functions.
- Compact and light weight
- Simultaneous measurement of overall vibration level, multi-type
- FFT spectrum analysis
- Abnormal vibration analysis
- Time waveform analysis
- Data analysis and data control available when data is stored in common host computer
 - Saved data is transferred to host computer using ActiveSync
- Abnormal judgment function by vibration severity (ISO-10816)
- Abnormal bearing judgment function by enveloped acceleration(E3) meas.
- Earphone function allows audio analysis
- Low to high frequency measurements
 - Use with accelerometer, electro-dynamic velocity pickup
 - Selects pickup best suited for measurement type
- Vibration terminology dictionary included

CardVibro Neo Components

	Description	Q'ty	Model	Remark	Outside View
Model	CardVibro Neo	1	VM-2004Neo	-----	
	Module	1	VA-2004Neo	-----	
Main Unit	(CardVibro Neo Software)	1	CardVibro Neo	CD-ROM or SD Card	-----
	Accelerometer	1	VP-2001A	Direct cable 1.5m, with plug	
	Probe for pickup	1	VB-2001	Probe length 55mm	
	Case	1	C-2004	-----	
	User Manual	1	IM-2004	-----	-----
Accessories	Data Extract Software	(1)		CD-ROM	-----
	Velocity Pickup	(1)	VP-2001V	Option	
	Low-band Vibration Pickup	(1)	VP-2001PS	With cable 1.5m and Plug	-----
	Long cable 3m	(1)	CE-2001-3	Pickup extension cable 3m with both connectors	-----
	Long cable 6m	(1)	CE-2001-6	Pickup extension cable 6m with both connectors	-----
	Long cable 10m	(1)	CE-2001-10	Pickup extension cable 10m with both connectors	-----
	Output cable	(1)	CO-2001	Length 1.2m	-----
	Small Magnet (Strong type)	(1)	MH-201R	Strong type, Common for accelerometer and velocity pickup	
	Probe for pickup	(1)	PI-2001	Probe length 185mm	-----
	Earphone	(1)	HE-2001	Used with VP-2001A with 2.5φ mini plug	-----
	Charge amplifier	(1)	CA-2001	-----	-----
	Shoulder Bag	(1)	B-2001	-----	-----

Preparation

View of the CardVibro Neo

CardVibro Neo Unit Installed in Pocket PC



Fig: CardVibro Neo Unit Installed in Pocket PC.

View of the CardVibro Neo

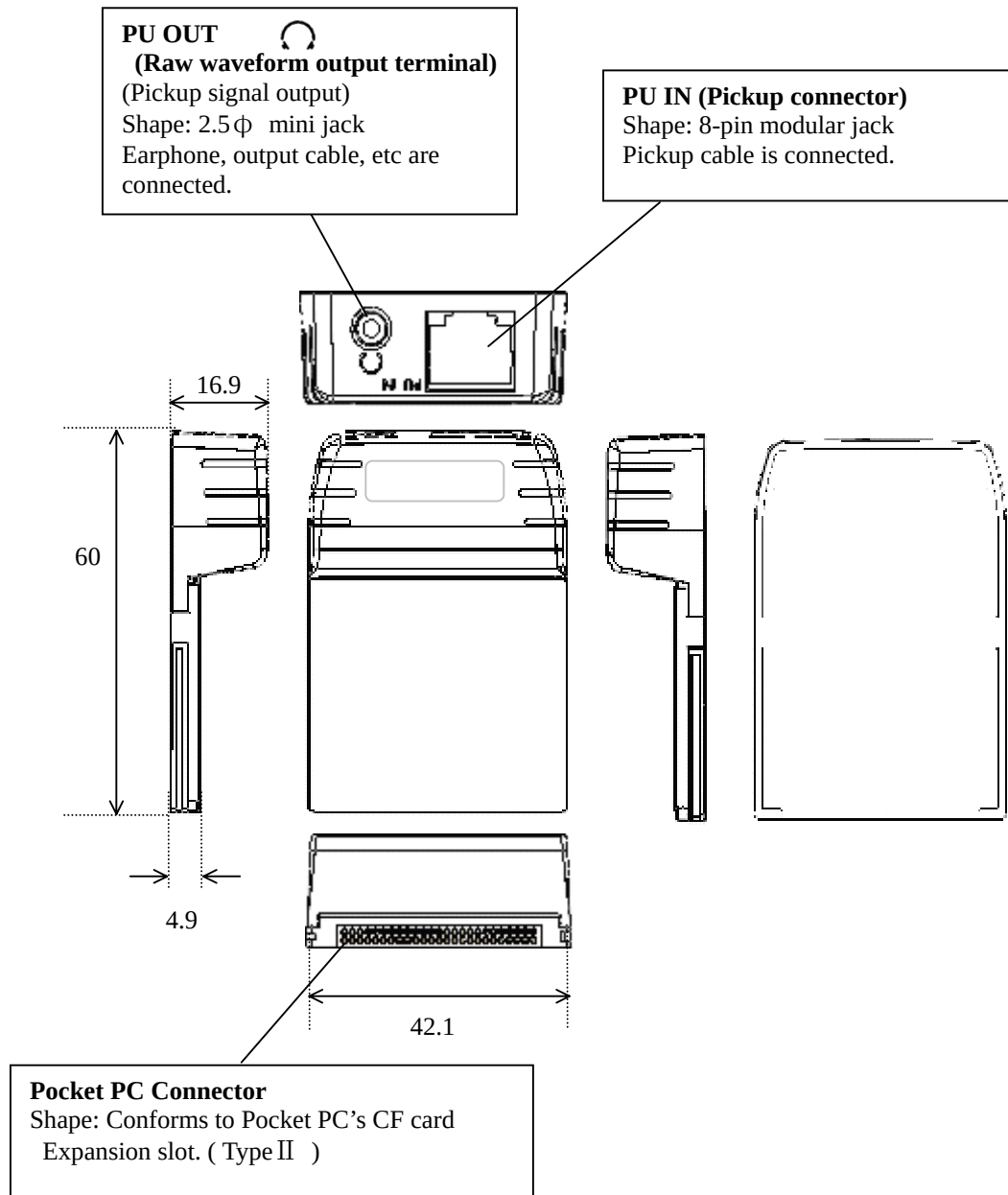


Fig: Various Views of the CardVibro Neo Unit.

View of the Pocket PC

!Information: The button arrangement shown below depends on the used Pocket PC. See User manual for your Pocket PC.



Fig. A Pocket PC View.

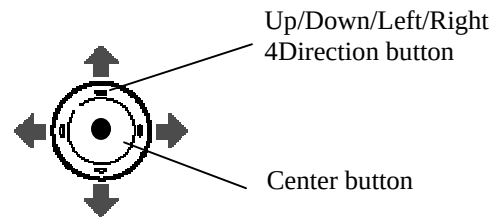
- Program button

Even power is set at OFF, the assigned program will start with pressing the program button. It is generally set to the program as [Calendar][Tasks] [Home][Contacts] which depends on the used Pocket PC in the default condition.

!Information: Setting of the assignment for program button can be changed. For example, if CardVibro Neo is assigned, it is convenient to start the program immediately. See the user manual for used Pocket PC as for setting.

- Cursor button

Press each direction button of cursor button to move the cursor focus on the screen (selection display).



Press the Center button of the Cursor button to start the selected program.

!Information: Moving of cursor depends on screen. There is the direction which cursor does not move.

- How to use of the stylus

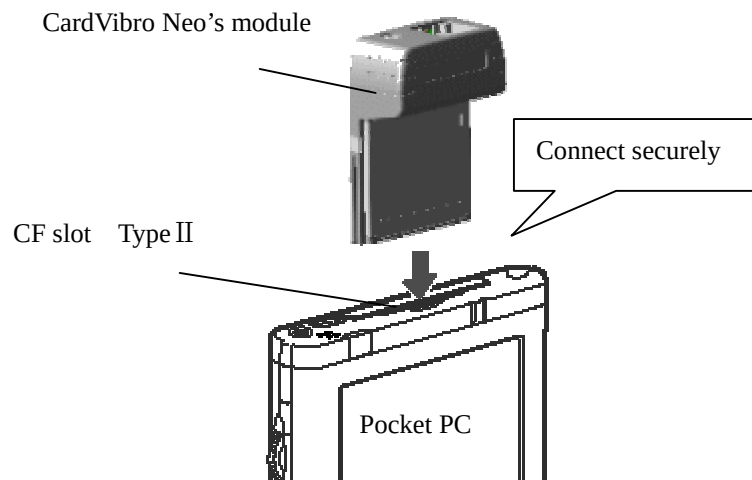
Stylus is used to select the menu or input the data on touch screen of Pocket PC.
Use as below.

Tap	The operation to touch once the touch screen. It is used to select screen menu, icon, button.
Tap & Hold	The operation to tap continuously the touch screen. With doing[Tap & Hold] the icon on the screen or item, the red circle mark is indicated and pop-up menu will appear.
Drag	[drag] operation on touch screen with using stylus. The operation is available for the moving of icon on the screen, manual input and drawing.

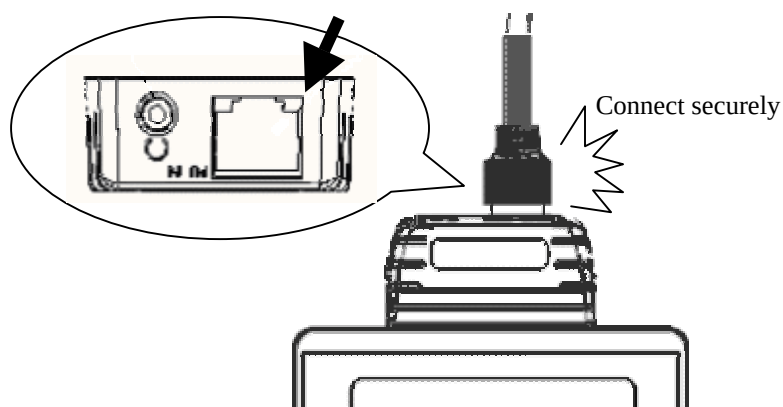
Booting up the CardVibro Neo

Procedure to start the CardVibro Neo

- Please turn off the power supply of Pocket PC.
 - Please refer to the manual of Pocket PC for a detailed handling explanation of CF card slot.
- Insert the CardVibro Neo's card in CF slot.



- Connect the pickup cable with the PU IN connector.
 - At this time, the power supply is turned on.



- Turn on the power supply of Pocket PC.

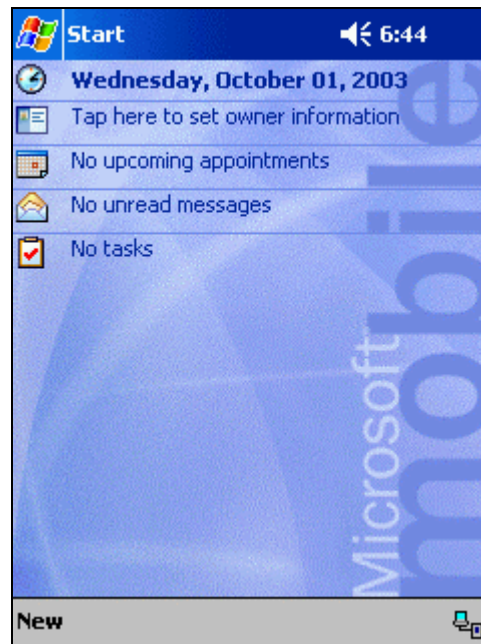


Fig: Example of TODAY screen

- Tap  [Start] in the upper-left corner of screen.
 - Tap [Programs] in Start Menu.
 - Tap **CardVibro Neo** icon to start in [Programs]. 
- When started, **Main menu** screen of the **CardVibro Neo** will display.

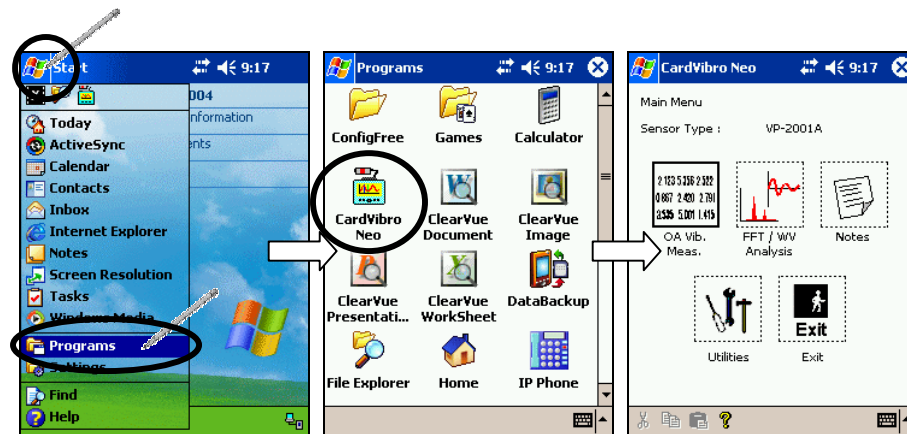


Fig: To start CardVibro Neo

!Information: When the program other than the CardVibro Neo is booted up, complete the other program, then start the CardVibro Neo.
If other program is booted-up, CardVibro Neo may not operate normally.

Sensor / Sensitivity Setting

- Set Sensor sensitivity in the **Utilities Menu's Sensor / Sensitivity Setting** screen. Refer to the **Using the Utilities Menu / Sensor** section later in this manual for more information on Sensor use.

Other General Setup Procedures

- Use the **Utilities Menu's Units** option to select either **English** or **Metric** measurement units.
- Use the **Utilities Menu's Accel fmax** option to set fmax for acceleration (A) overall vibration (the measurement upper frequency limit).
 - FFT measurements provide an fmax setup option.

General Operation

Main Menu

When CardVibro Neo is started, the Initial screen displays. Follow by the **Main Menu** screen.

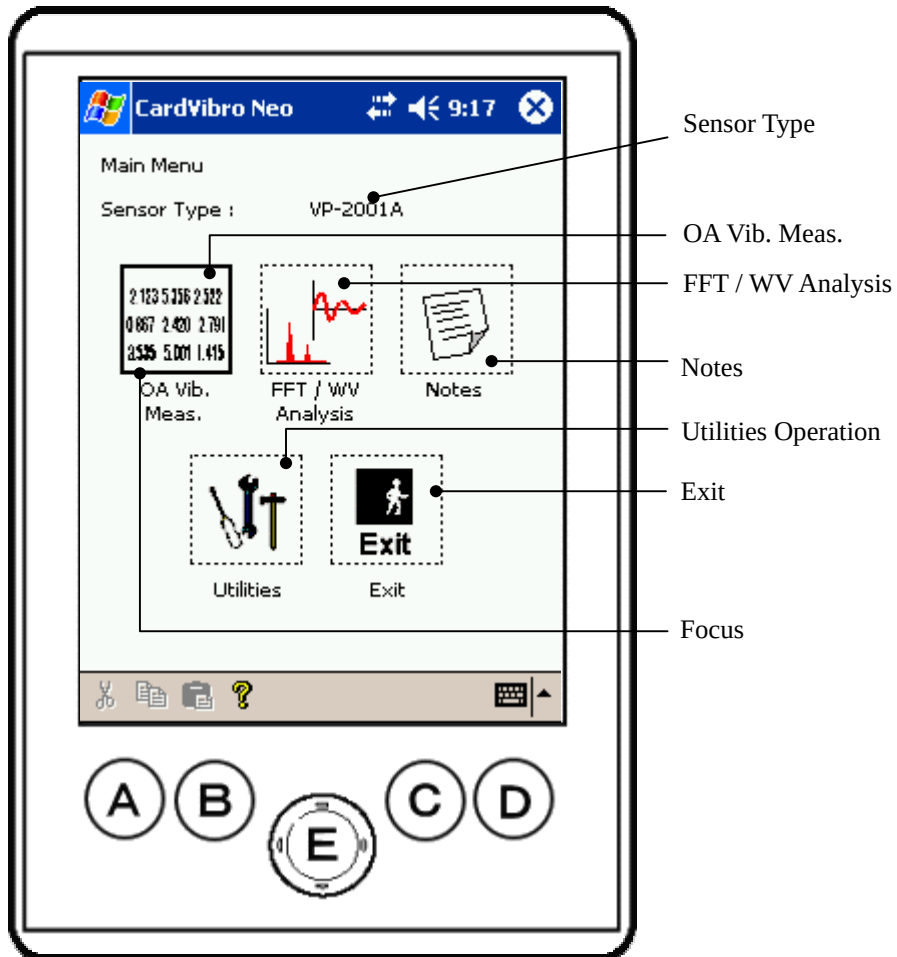


Fig:Main Menu

[Display Item]

- **Sensor Type**

The Main Menu displays the Sensor Type (pickup type) at the top of the display.

If necessary, set the sensor type and sensitivity with the Utilities Menu's Sensor / Sensor type / Sensor Sensitivity options.

Refer to the Using the Utilities Menu / Sensor section later in this manual for more information on sensor settings.

- **OA Vib. Meas. button**

Tap the **OA Vib. Meas.** button to display the vibration level (overall value) measurement screen.

- **FFT / WV Analysis button**
Tap the **FFT / WV Analysis** button to display the frequency analysis measurement screen.
(waveform value screen)
- **Utilities button**
Tap the **Utilities** button to display the **Utilities Menu**.
- **Exit button**
Tap the **Exit** button to finish the CardVibro Neo.
- **Focus**
Push the **E** button (Up/Down) to move the Focus.

[Function of hard key button]

E button (Up/Down) : Focus moves.

E button (Center) : Executes the function of the focus button.

Using the Vibration Pickup

The CardVibro Neo uses three sensors / pickups:

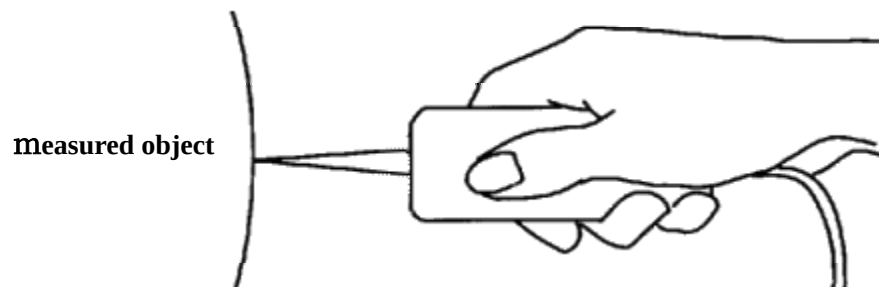
VP-2001A Accelerometer

VP-2001V Electro-Dynamic Velocity Sensor

VP-2001PS Piezo-resistive Acceleration Pickup

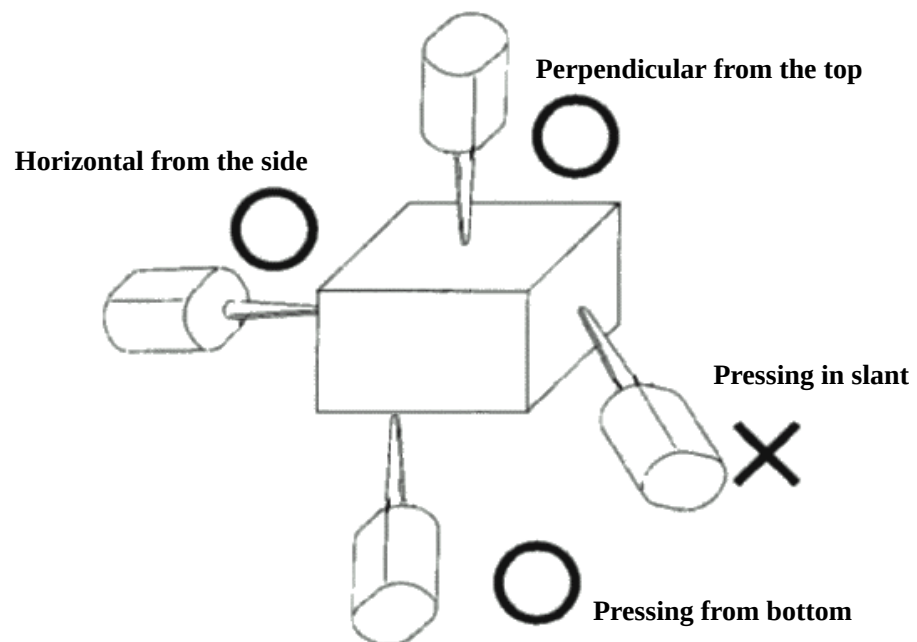
Observe Proper Sensor Orientation.

- Hold the vibration pickup against the object to be measured.
Tap the CardVibro Neo's measurement **Start** button to initiate measurement collection.



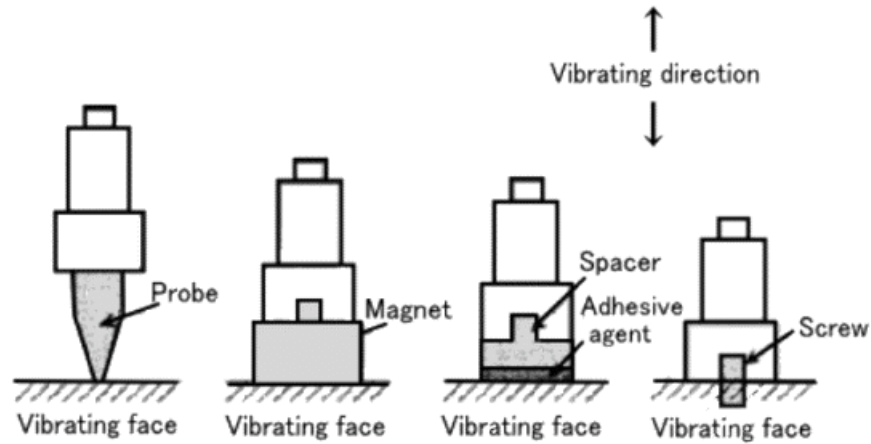
Proper Way to Hold Vibration Pickup Against Object.

- Ensure the correct direction and angle of the pickup.



Examples of Proper and Improper Ways to Hold Pickup Against Object.

- IMV Service recommends the use of a magnet for waveform measurement and long term frequency analysis.
 - Do not move pickup during measurement.



- Put the low band vibration pickup (VP-2001PS) on the flat surface with stable condition. After the preparation of pickup, tap 「Measurement」 start button of CardVibro Neo to measure.



- When pickup is not put stably for machinery measurement (iron-type), adhesive agent or double adhesive tape are available. When vibration level is high, take care the chatter and drop.



Overall Vibration Measurements

- The Main Menu displays the Sensor Type (sensor type) at the top of the display. If necessary, set the sensor type and sensitivity with the **Utilities Menu's Sensor / Sensor type / Sensor Sensitivity** options. Refer to the **Using the Utilities Menu / Sensor** section later in this manual for more information on sensor settings.

To perform overall vibration measurement:

Tap the Main Menu display's OA Vib. Meas. button.

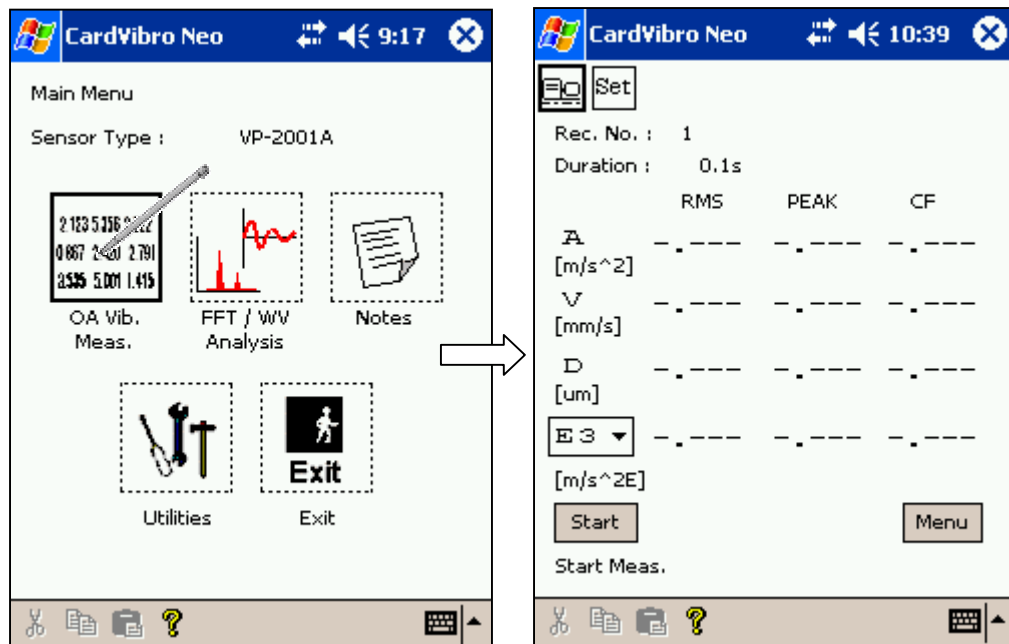


Fig: To perform overall vibration measurement

OA Vib. Meas. screen

Information on the Overall value measurement screen includes:

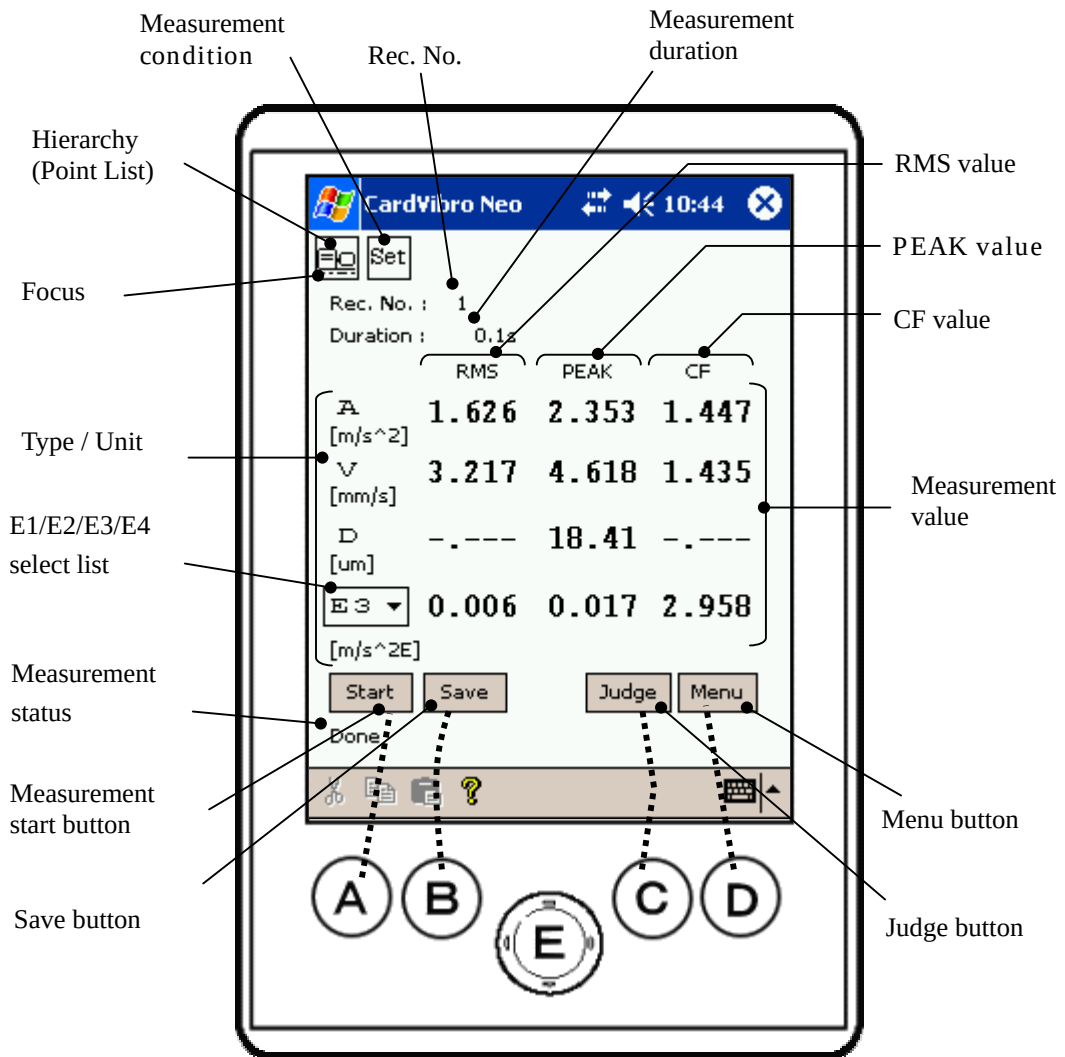


Fig. Overall Vibration Measurement Display

[Display Item]

- **hierarchy**
Indicates the hierarchy of measurement points. (Refer to the item of hierarchy for the description of hierarchy.)
Relates the measurement point with the measurement data.
- **Measurement condition**
Displays the Meas. Setup screen for OA value measurement.
- **Rec. No.**
Automatically assigned in sequence for a new measurement.
- **Measurement duration**
Displays the measurement time set on the Meas. Setup screen.

• **Type•Unit**

A – acceleration, V - velocity, D - displacement, E1 – Envelope Detection (5Hz – 100Hz), E2 – Envelope Detection (50Hz – 1000Hz), E3 – Envelope Detection (500Hz – 10kHz), E4 – Envelope Detection (5kHz – 20kHz) – Specify the measurement type, units, and detection. Defaults to Acceleration for VP-2001A sensors ,and Velocity for VP-2001V sensors, and Acceleration for VP-2001PS sensors.

Type	Metric	English
Acceleration	m/s^2 (RMS•PEAK•CF)	G (RMS•PEAK•CF)
Velocity	mm / sec (RMS•PEAK•CF)	inch / sec (RMS•PEAK•CF)
Displacement	μm – (PEAK to PEAK) [EQP]	mils – (PEAK to PEAK) [EQP]
Enveloped Acceleration	m/s^2E (RMS•PEAK•CF)	GE (RMS•PEAK•CF)

- Measurement units are set with the Utilities Menu’s Units option.
- If a velocity sensor / pickup is specified, only V and D measurements are available.
- If a Piezo-Resistive sensor / pickup is specified, only A,V and D measurements are available.

• **RMS(root mean square value)**

Displays the Root mean square value.

Square root of the average of the squared values of each momentary measured value during measurement time (range)

$$V_{rms} = \sqrt{\frac{1}{T} \int_{t_1}^{t_2} V(t)^2 dt}$$

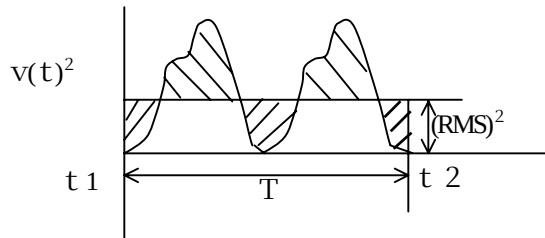


Fig: RMS

• **PEAK(peak value)**

Displays the Peak Value.

Maximum value in measurement time (range)

$$V_{peak} = |V(t)| \max$$

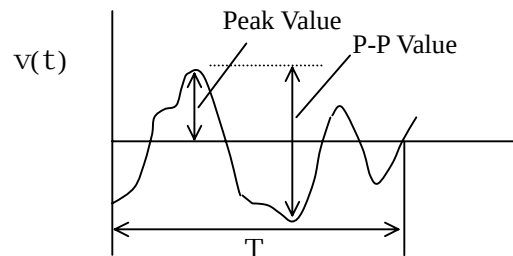


Fig: Peak

- **Equivalent peak**

The calculated peak value assuming the waveform as complete sinusoidal wave.

The peak value of Displacement D of CardVibro Neo is the equivalent peak value.

It will not be the same value as peak value and rms value.

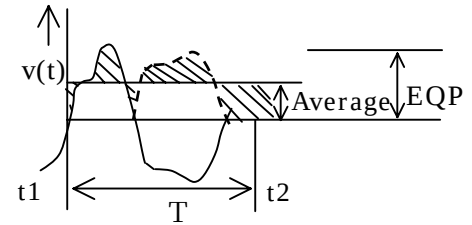


Fig: EQP

$$EQP = Average \times \frac{\pi}{2} = \frac{\pi}{2} \cdot \frac{1}{T} \int_{t1}^{t2} |v(t)| dt$$

$$Average = \frac{1}{T} \int_{t1}^{t2} |v(t)| dt$$

- **CF (Crest Factor)**

Displays the Crest factor.

The ratio of Peak value to RMS value is called as CF(Crest factor).

$$CF = \frac{Peak}{RMS}$$

- **Measurement Value**

Displays the Measurement value.

- **E1 / E2 / E3 / E4 select list**

Selects the Enveloped Acceleration among E1/E2/E3/E4, and measures.

- **Measurement Start button**

Starts the measurement.

- **Save button**

Displays the **Save Data** screen.

- **Judge button**

Displays the judgment selection menu screen for **ISO Vibration Evaluation Standard, Bearing Evaluation.**

- **Menu button**

Displays the main menu screen.

- **Measurement Status**

Displays Measurement Status.

Start Meas. :The measurement starts when the start button is tapped.

Busy... :The CardVibro Neo is performing the measurement.

Done :The measurement is complete.

- **Focus**

Focus locates on the button selected by the cursor button E up/down.

[Function of hard key button]

A button	:Starts measurement (Measurement button)
B button	:Displays the Save Data screen (Save button)
C button	:Displays the Judgment selection menu screen (Judgment button)
D button	:Displays the main menu screen (Menu button)
E button (Up/Down)	:Focus moves.
E button (Center)	:Executes the function of the focus button.

Measurement Setup of Overall value measurement

To set up the OA measurement:

Tap the OA Vib. Meas. display's **Set** button.

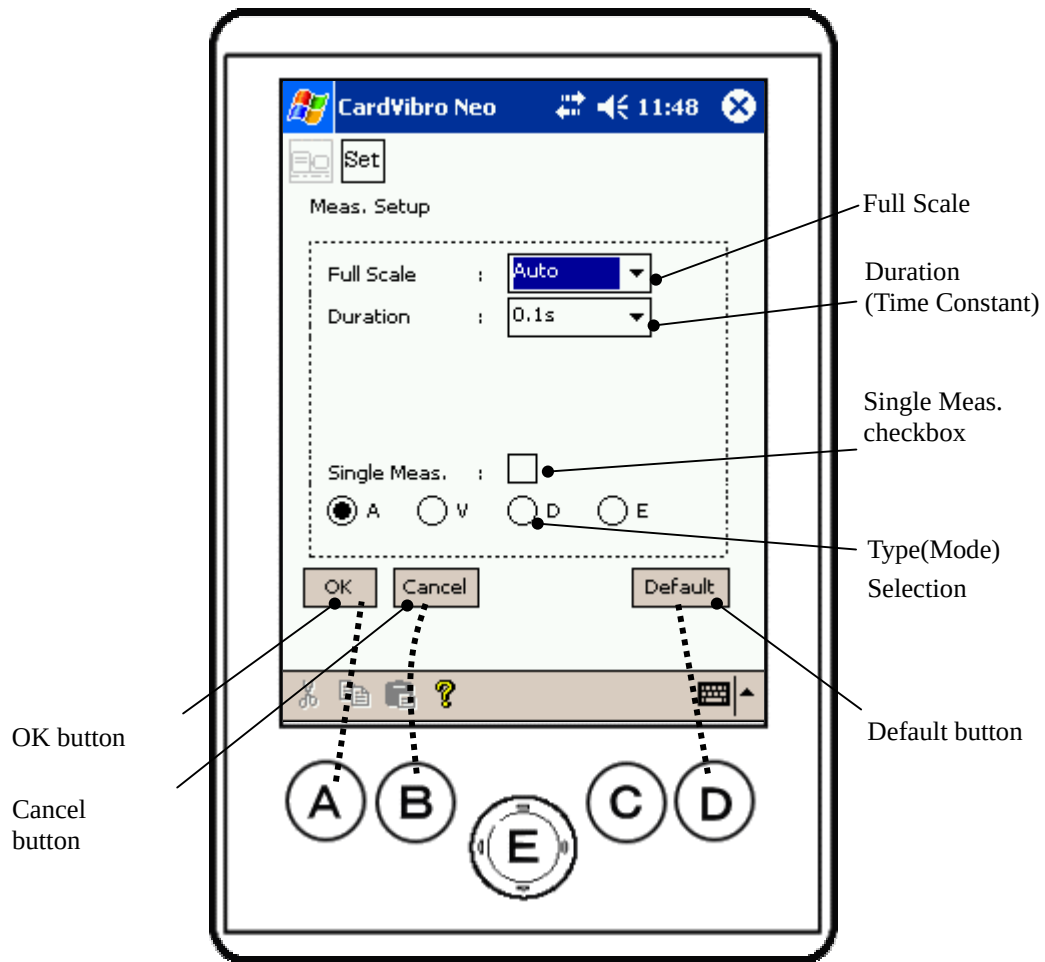


Fig: Measuring Condition screen

[Display Item]

- **Full Scale (Range)**
It is auto range. Selects the suitable range and measures.
- **Duration** (0.1 / 0.5 / 1 sec)
Sets the measurement duration, in seconds. Defaults to 0.1 second.
If the VP-2001PS is specified, Duration is selectable among 1.0/5.0/10.0 sec.
- **Single Meas. Check box**
In case to measure individually every type, check here.
Measures the selected type individually.
The default value is set without check.
- **Type Selection of Single Meas. .**
Select one type. Defaults to "A".

- **OK button**
Sets the measurement condition and returns to OA value measurement screen.
- **Cancel button**
Returns to OA value measurement screen without setting the measurement condition.
- **Default button**
Resets the setting to the default value.

[Function of hard key button]

A button	:Sets the measurement condition and returns to OA value measurement screen(OK button)
B button	:Returns to OA value measurement screen without setting measurement condition.(Cancel button)
D button	:Resets the setting to the default value (Default value button)
E button (Up/Down)	:Focus moves.
E button (Left/Right)	:When Focus locates on type selection, focus moves in right/left direction to select type.
E button (Center)	:Executes the function of the focus button.

To start the Overall measurement

Place the vibration pickup in the correct measuring position and tap the **Start** button or press the hardkey **button A** on the Pocket PC's bottom left to begin the measurement.

The measurement results display.

!Caution: If Start button is tapped, the measurements start immediately. After pickup is pressed on the measuring point, start the measurement.

Numerical Display

Displays the measurement's numerical values and measurement units. Measurement results are displayed as RMS, PEAK, and C.F. (crest factor).

Crest factor is ratio of PEAK / RMS, and is used to identify impulsive response.

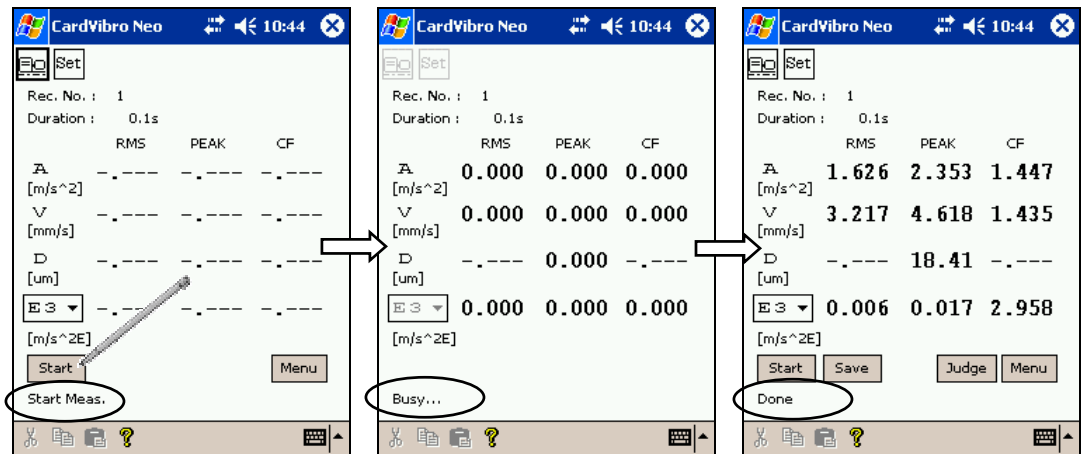


Fig:OA Vib. Meas. screen

Measurement Status - Displays measurement status as either **busy**, the CardVibro Neo is performing the measurement, or **Done**, the measurement is complete.

Judgment of Vibration Level

The **Judgment** button displays when the measurement results in a condition that allows the abnormal judgment function. Two types of abnormal Judgments are available, depending on the vibration measurement type:

ISO Evaluation – available for **Velocity**.

Bearing Evaluation – available for Enveloped Acceleration **E3**.

!Information: In individual measurement, the measurement at other than **Velocity V**, **Enveloped Acceleration E3** meas., **Judge button** does not display.

Select Menu of Vibration Evaluation Standard

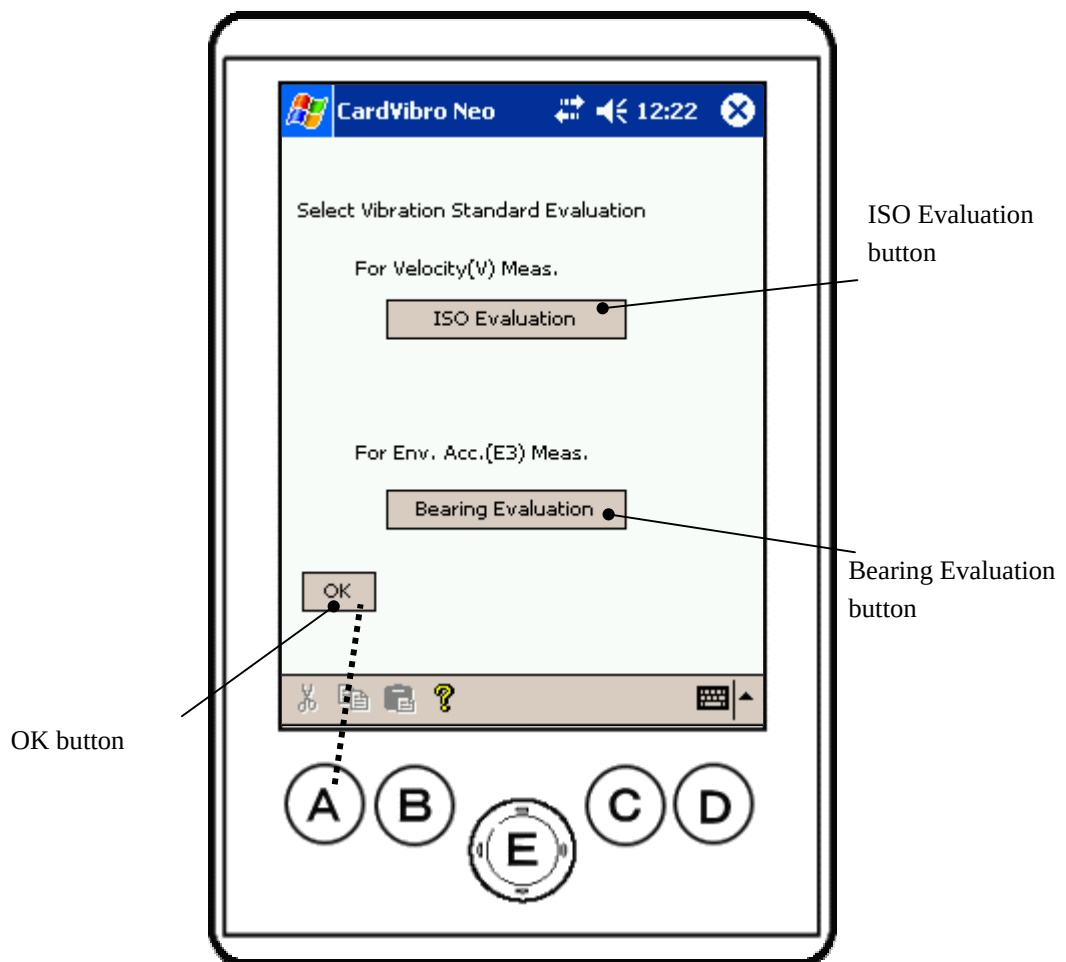


Fig: Selection menu of Vibration Standard Evaluation

[Display Item]

- **ISO Evaluation button**
The **ISO Vibration Evaluation** screen displays.
!Information: When Velocity V is not measured, the button cannot be tapped.
- **Bearing Evaluation button**
The **Bearing Evaluation** screen displays.
!Information: When Envelope acceleration E3 is not measured, the button cannot be tapped.
- **OK button**
Returns to the measurement screen.

[Function of hard key button]

- | | |
|--------------------|---|
| A button | :Returns to the measurement screen(OK button) |
| E button (Up/Down) | :Focus moves. |
| E button (Center) | :Executes the function of the focus button. |

Judgment of Machinery Vibration Level

ISO Vibration Evaluation

Use the class selection buttons to specify the machinery classification for your machinery vibration measurement. Judgment ranges update for the selected machine class.

- If unsure of the proper machinery classification use the Information button for a more detailed description of the ISO standard.

Tap **OK** when finished.

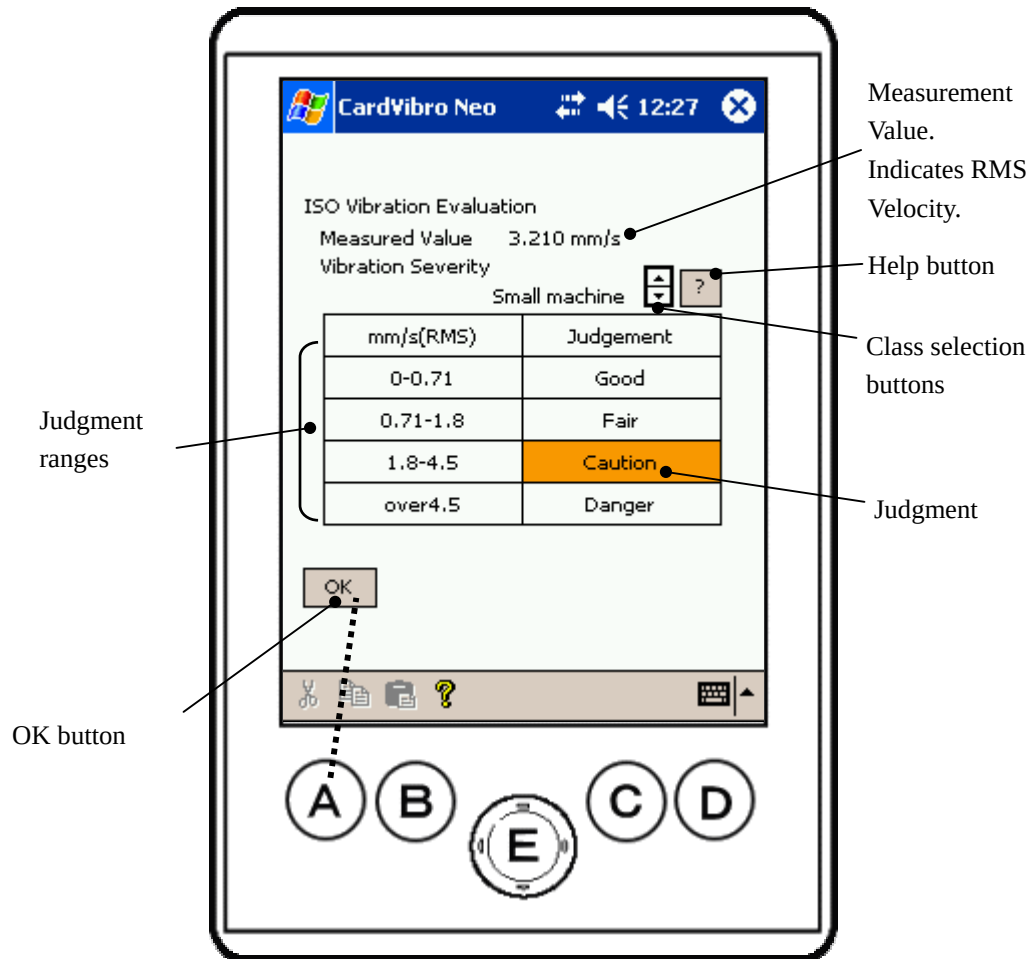


Fig: ISO Vibration Evaluation Standard Screen

[Display Item]

- **Measurement Value**
Indicates RMS velocity.
- **Class selection buttons**
Use the class selection buttons to specify the machinery classification for your machinery vibration measurement. Judgment ranges update for the selected machine class.
Options are: **Small Machine/Medium Machine/Large Machine A/Large Machine B**

- **Judgment**
Displays the result of judgment. Color of corresponding column of judged result will reverse.
- **OK button**
Returns to the vibration evaluation standard selection menu screen.
- **? Help button**
If unsure of the proper machinery classification use the Help (?) button for a more detailed description of the ISO standard.

[Function of hard key button]

- | | |
|--------------------|---|
| A button | :Returns to the vibration evaluation standard selection menu screen
(OK button) |
| E button (Up/Down) | :Focus moves.
When focus is located on the class selection button, changes the class and displays. |
| E button (Center) | :Executes the function of the focus button. |

ISO Severity Judgment:

Vibration evaluation standard by ISO-10816 (JIS-B-0906).

1. Applied standard
600-12000rpm
2. Measuring point
Point where vibration energy is transmitted to the resilient mountings.
(bearings and mountings points of the machine)
3. Rotor classification
 - (a) Small machine(Class 1)
Machine of which electrical motor up to 15kW
 - (b) Medium-sized machine(Class 2)
Machine of which electrical motor with 15-75kW or up 300kW on special foundations
 - (c) Large Machine A (Class 3)
Large machine mounted on rigid and heavy foundations
 - (d) Large Machine B (Class 4)
Large machine mounted on found which are relatively soft in the direction of vibration measurement

Bearing Evaluation

Select the Classification according to the inner diameter of bearing and the rotational number of shaft and ensure the judgment.

- If unsure of classification use the Help button for a more detailed description of the Bearing Evaluation.

Tap **OK** when finished.

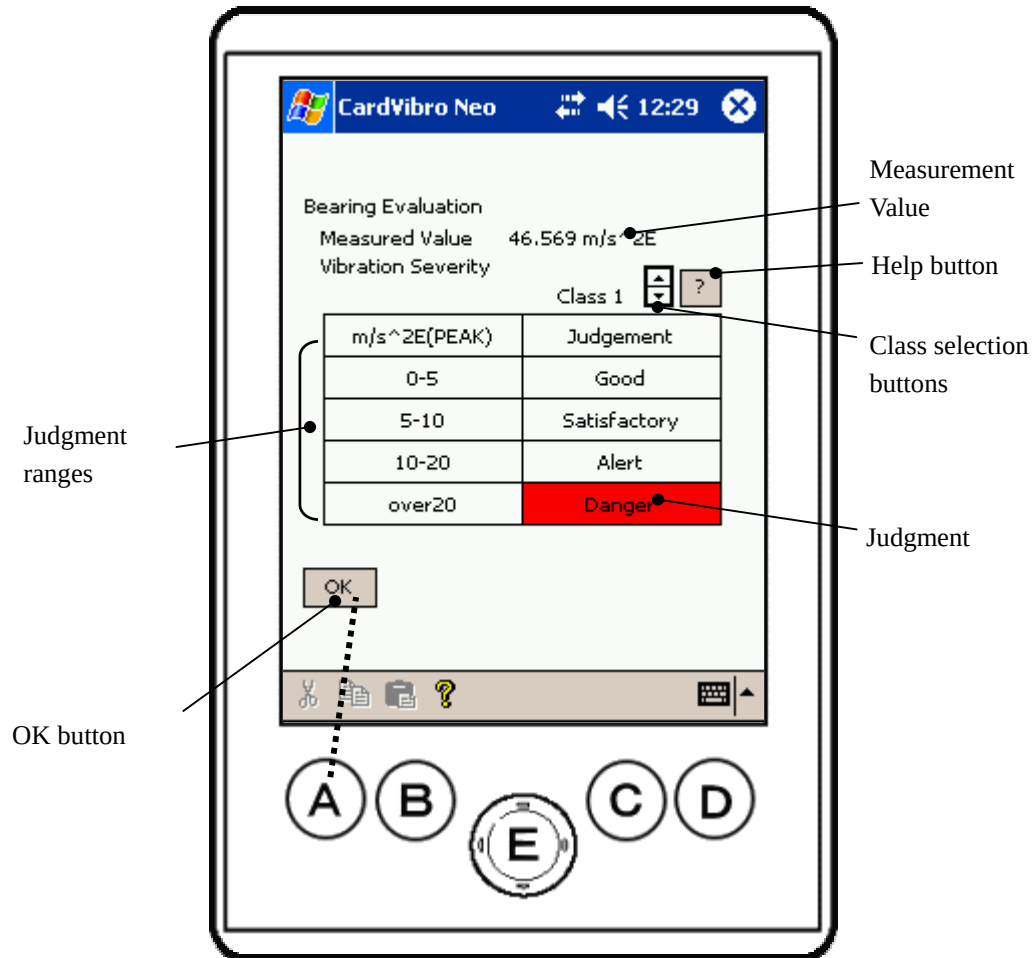


Fig: Bearing Evaluation Screen

[Display Item]

- **Measurement value**
Indicates PEAK enveloped Acceleration E3 ([GE] or[m/s²E]).
- **Class selection buttons**
Use the class selection buttons to specify the classification for your bearing vibration measurement. Judgment ranges update for the selected classification.

Options are:

(a) Class1

bearing bore diameter

:Dia. between 200 and 500 mm

shaft speed

:Speed<500rpm

(b) Class2

bearing bore diameter

:Dia. between 50 and 300 mm

shaft speed

:Speed between 500 and 1800 rpm

(c) Class3

bearing bore diameter

:Dia. between 20 and 150 mm

shaft speed

:Speed is either 1800 or 3600 rpm

- **Judgment**

Displays the judgment. Color of the corresponding column of judgment will reverse.

- **OK button**

Returns to the vibration evaluation standard selection menu screen.

- **Help button**

If unsure of classification use the Help (?) button for a more detailed description of the Bearing Evaluation.

[Function of hard key button]

A button :Returns to vibration evaluation standard selection menu (OK button)

E button (Up/Down) :When focus is located on class selection button, changes the class and displays.

E button (Center) :Executes the function of the focus button.

Saving the Overall Measurement

To save the measurement results:

Tap the **Save** button to display the **Save Data** screen.

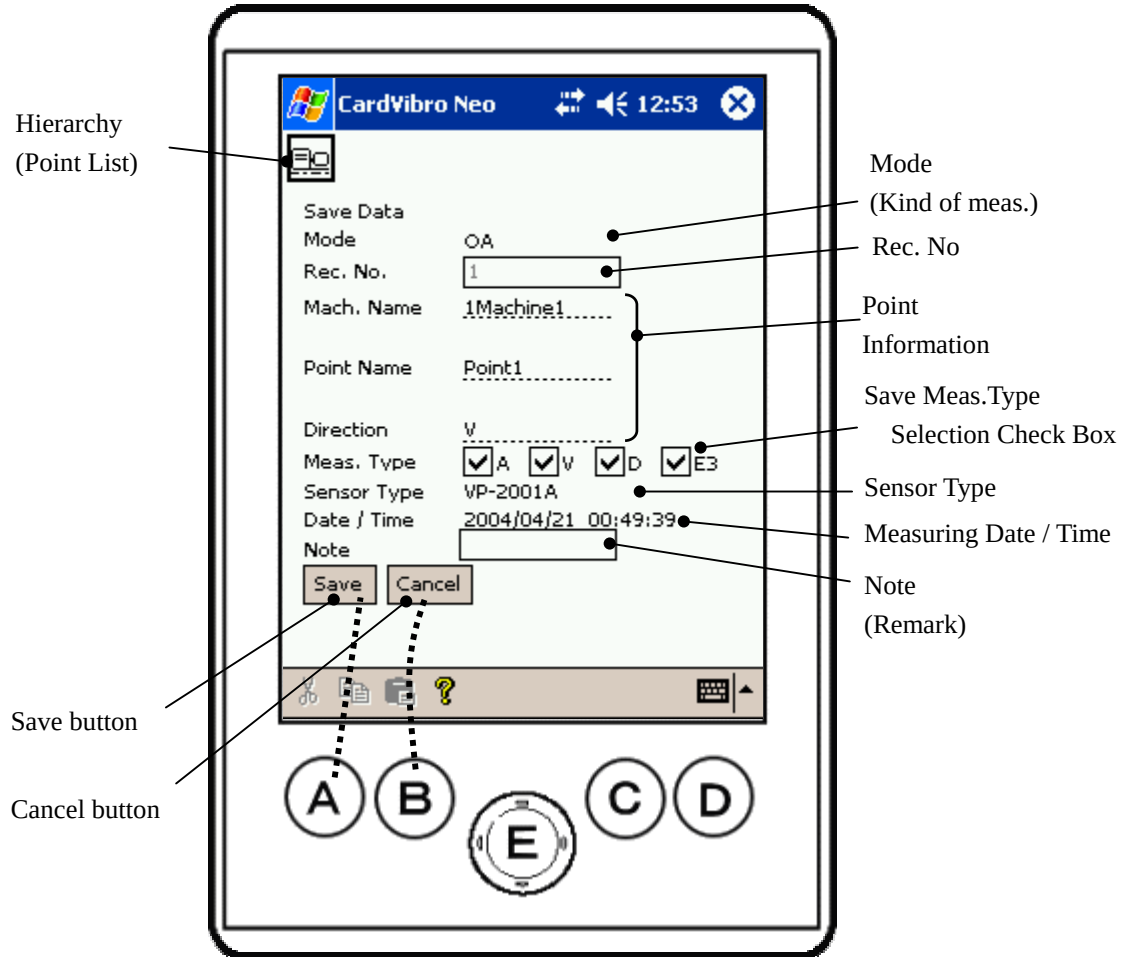


Fig:The Save Data screen of OA measurement

[Display Item]

- **Mode**
Displays the kind of measurement mode. (Overall Value measurement is displayed as OA.)
- **Rec. No.**
Displays the control number of measurement data. The number is assigned automatically in sequence for saved measurement data.
- **Measurement Point Information**
Displays the measuring point information as Machine name/Point name/Detecting direction etc. Select the measuring point information from **the hierarchy of measurement point** and saves it related with measured data.
Resistor the measuring point list at **hierarchy Edit** in Utilities.

- **Hierarchy (Point List)**
Displays the hierarchy screen. (Refer to the chapter for hierarchy as for the description of the hierarchy.) Relates the Measurement point with the measured data.
- **Save Meas. Type Selection Check Box**
Check the meas. type to be saved. All default values are the condition with check.
- **Sensor Type**
Displays the type of measured sensor.
- **Date / Time**
Displays the measured date and time.
- **Note**
Enter a note to store with the data (e.g. noisy, odor, leak, etc.).
It can be inputted up to 50 byte.
- **Save button**
Saves into the database with tapping.
- **Cancel button**
Returns to the measurement screen without save.

[Function of hard key button]

A button	:Saves into the database with tapping. (Save button)
B button	:Returns to the measurement screen without save. (Cancel button)
E button (Up/Down)	:Focus moves.
E button (Center)	:Executes the function of the focus button.

Hierarchy (Point List)

Tap  Hierarchy button to display the Hierarchy screen. (Measuring Hierarchy screen is displayed from measurement screen or saved screen.)

Saves the measured data with adding measuring point information (Plant name/ Machine name/ Point name) selected on the Hierarchy screen (the measuring point list screen).

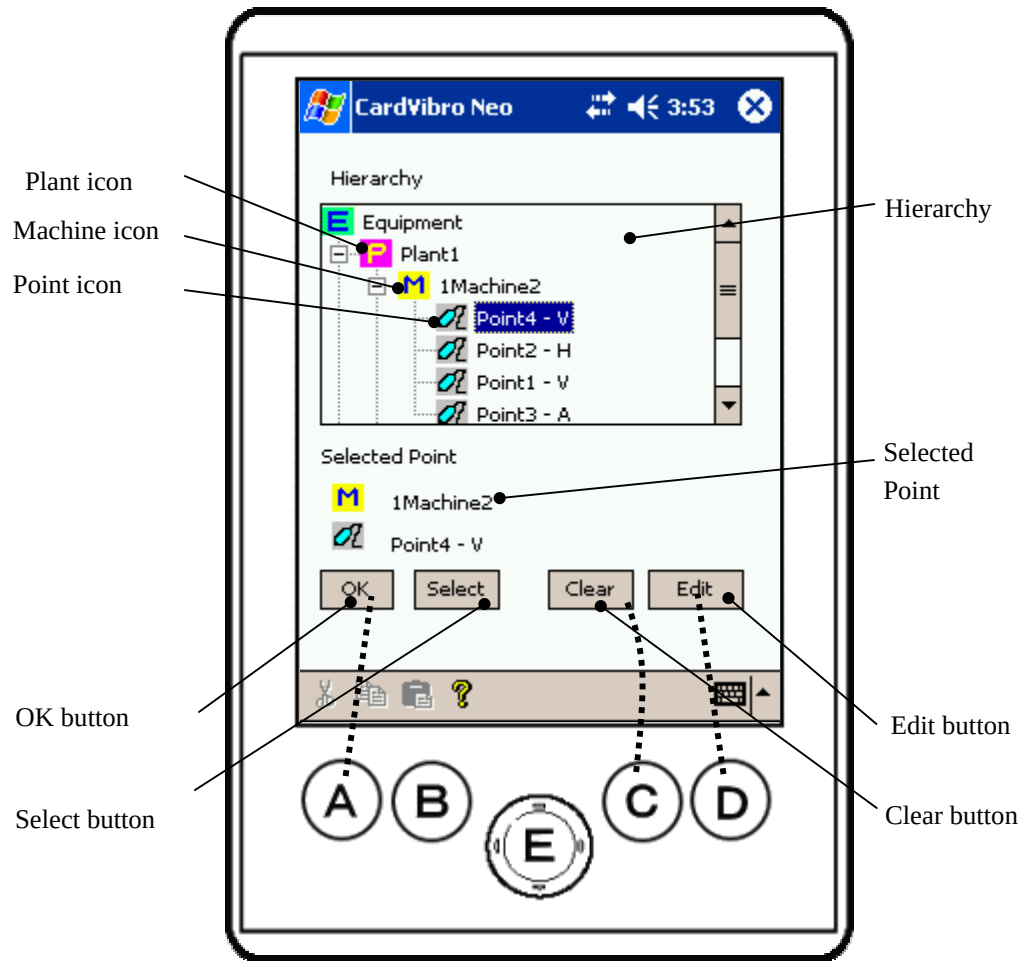


Fig: Point List screen

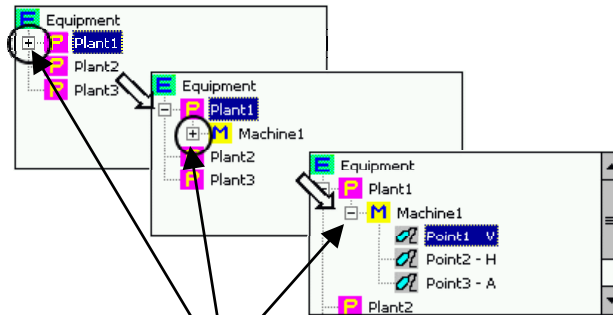
[Display Item]

- **Hierarchy (Measuring Point List)**

Displays all measuring point list (plant name, machine name, point name) registered in **Edit Hierarchy** on hierarchy.

The hierarchy of tree is as below.

 Plant >  Machine >  Measuring point



+ mark shows the existence of lower hierarchy.
 Tap + mark to extend the tree.
 - mark shows the lowest hierarchy.
 Tap - mark to close the extended tree.

- **Plant icon**

shows plant.

- **Machine icon**

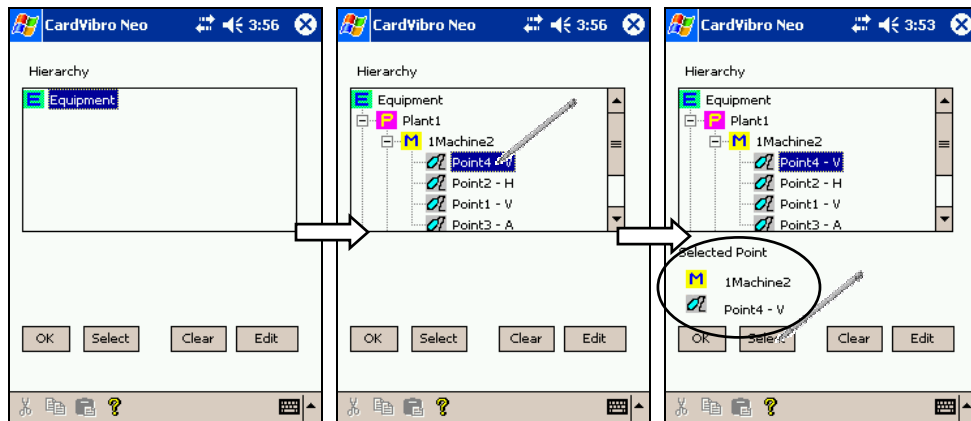
shows machine.

- **Point icon**

shows the measuring point icon.

- **Selected measuring point**

Select and tap one measuring point on hierarchy and press **Select** button to display **the selected point** (Machine name/ Point name-Detecting direction)



- **OK button**

Confirms the selected measuring point and returns to the measurement screen or Data save screen.

- **Select button**

Selects the measuring point selected on tree.

!Caution:When the **select button** is pressed, it is not to confirm to the selected measuring point. It confirms when OK button is pressed.

- **Clear button**

Clears the displayed contents of selected measuring point.

- **Edit button**

Displays the **Edit Hierarchy** screen.(Refer to the chapter of **Edit Hierarchy** for detailed description .) In Edit Hierarchy screen, measuring points can be added.

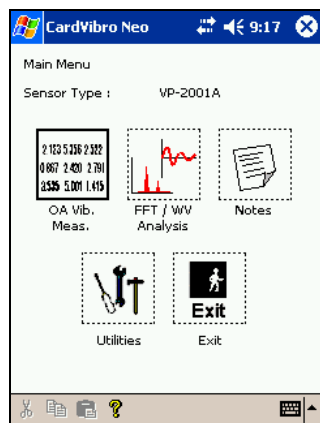
[Function of hard key button]

A button	:Confirms to the selected measuring point and returns to the measurement screen.(OK button)
B button	:Returns to OA value measurement screen without confirming.(Cancel button)
C button	:Clears the displayed contents of the selected measuring point. (Clear button)
D button	:Displays the Edit Hierarchy screen.(Edit button)
E button (Up/Down)	:Focus moves.
E button (Right)	:Extends the tree when there is the lower hierarchical data on tree.(+)
E button (Left)	:Closes the extended tree on tree and returns to original stage.(-)
E button (Center)	:Executes the function of the focus button.

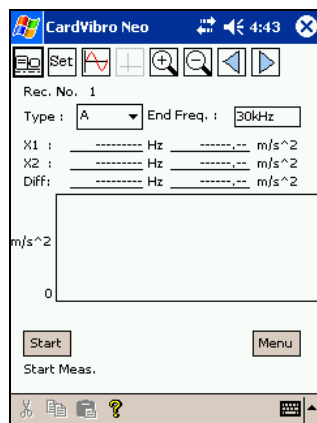
FFT / WV Analysis

!Caution: Before the measurement, complete the setting of **Sensor** in **Utilities Menu Screen** according to the used kind of sensor. (Refer to the chapter of setting of **Sensor** in **Utilities Menu** Screen in detail. Refer to [Using the Vibration Pickup] how to use each pickup.)

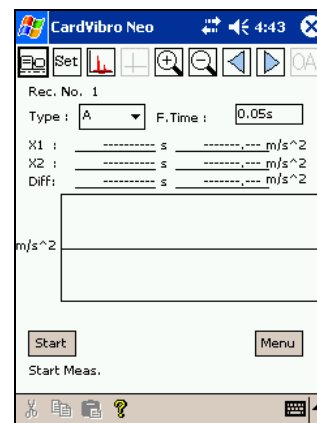
- Tap **Start** button on either Spectrum analysis or Waveform analysis screen to start the measurement with the analysis simultaneously.
- Display of **FFT / WV analysis** screen.
Select **FFT / WV analysis** button in **Main Menu** screen to display **FFT Analysis** Screen at first. Each FFT / WV measuring screen is changeable by   button.



Main Menu screen



FFT Analysis screen



WV Analysis screen

To set up the FFT Spectrum and Waveform analysis measurement

Tap **Set** button on the Measurement screen to display the **Meas. Setup** screen for FFT / WV analysis.

The FFT / Waveform Measuring Condition screen

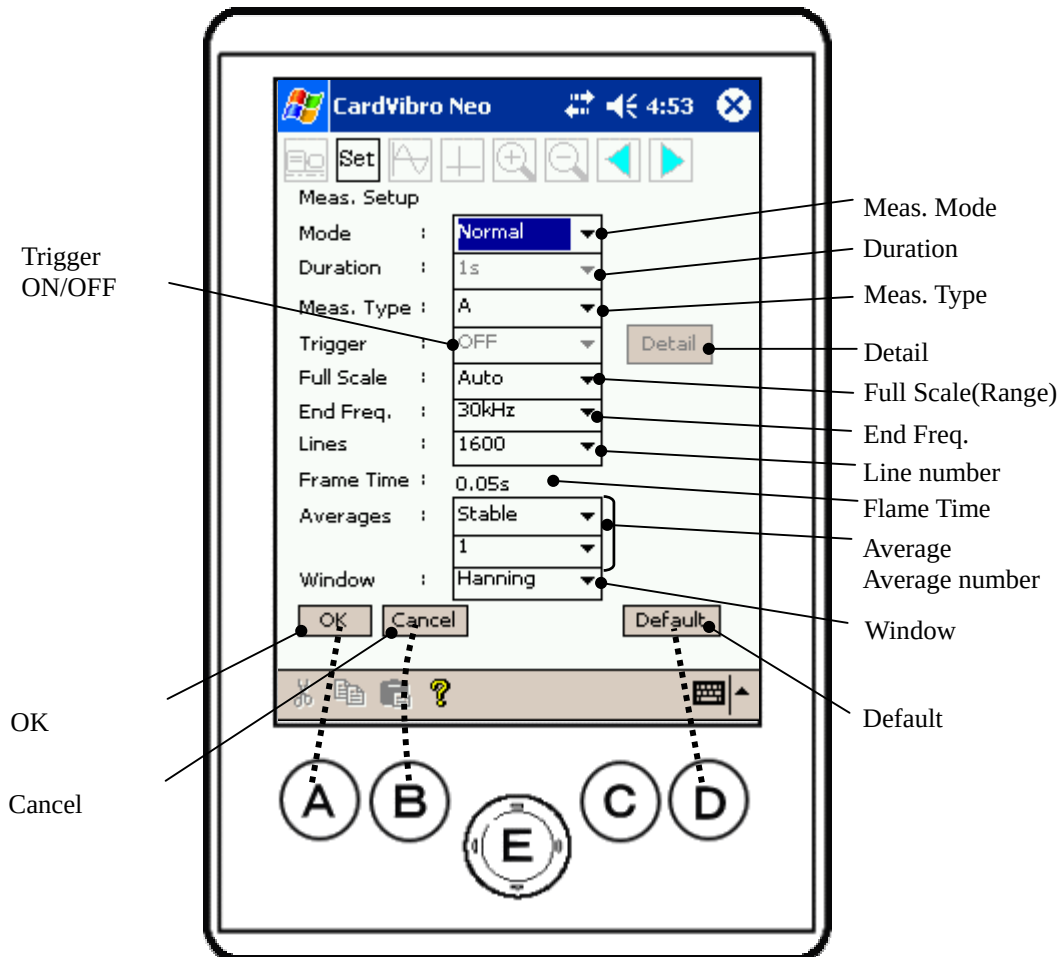


Fig:FFT WV analysis Measuring Condition Setting screen.

[Display Item]

- **Meas.Mode (Selection of Measurement Mode)**

Select among Normal/ Recorder/ Post Process.

Normal Type:

Recording time of waveform data is determined by the measuring condition of FFT analysis (analysis frequency, line number). FFT executes the measurement of specified average cycle and records the waveform (1-frame time) for measuring time of average 1-cycle.

Recorder Type(Measurement which Waveform recorded is prior):

Records the waveform for the specified by recording time. Averaging cycle of FFT is 1-time. (But, FFT measuring condition which specified recording time is less than 1

frame time is not specified.) Duration(Record Time): 1/2/5/10 second

Post Process Type:

Executes the calculation with using raw waveform data just before recording (temporary saved data). It is available for the measurement of other Mode with using waveform at the same measuring time. The average cycle of FFT is 1-cycle. Range setting, trigger function will be unavailable.

- **Duration (Record Time Selection)**

Selects the **Duration** of waveform at **Duration** among 1/2/5/10.

It can be specified only when the measurement type is **recorder**.

!Information: Selection of duration depends on the measurement mode.

- **Meas. Type Selection**

Selects the measuring type.

Meas. Type (A – acceleration, D - displacement, V - velocity, and E1~E4 - Envelope detection)

- Sets the measurement type. Defaults to Acceleration for VP-2001Asensors, and Velocity for VP-2001V sensors, and Acceleration for VP-2001PS sensors.

- **Trigger (Trigger ON/OFF Selection)**

Sets the measurement trigger ON or OFF.

Select ON when trigger function is used and do off when not used.

Trigger Type is input signal trigger.

!Information: Select a fixed scale (range) to use the trigger function. The trigger function is not available when **Auto Scale (Auto range)** is selected.

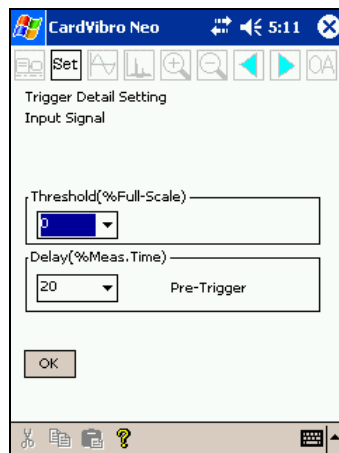
If **fixed range** is not selected at Range selection at first, ON/OFF of trigger cannot be selected.

- **Detail button**

Displays the Trigger Detail Setting screen, allowing you to set up the measurement trigger.

Input Signal **Threshold** Level (0 - 90% in 10% increments) – Select the appropriate trigger level from the drop down list. The trigger level should be high enough to avoid triggering on random noise. The trigger level is set as a percentage of your specified full scale range.

Trigger **Delay** (0 - 50% in 10% increments) – Set the trigger delay from the drop down list. The trigger delay is set as a percentage of your specified the measuring waveform time.



- **Full Scale (Range Selection)**
Sets the measurement's full scale range. Select range among Auto/ Fixed 4 range.
Defaults to Autorange. The specified measurement type (mode) determines range units.
- **End Freq. (Frequency Selection)**
Sets the measurement's maximum frequency (fmax) in Hz. Select the analysis frequency range among 50Hz/125Hz/250Hz/500Hz/1kHz/2kHz/5kHz/10kHz/ 15kHz /30kHz.
!Information: Available fmax settings are determined by the specified measurement type (Mode setting).
- **Lines (Selection of Line Number)**
Sets the number of spectral lines for the measurement. A higher setting provides higher measurement resolution, but extends measurement time. Defaults to 1600 lines.
Select the line number among 400,800, or 1600.
!Information: Selection of the line number depends on the measurement type.
- **Frame Time**
Waveform time for 1-cycle measurement (average) in FFT measurement.
- **Averages (Average Method. Average Cycle Selection)**
Sets the averaging method among Stable/ Exponential/ Peak Hold.
Sets the number of spectrum averages for the measurement. More averages provide more reliable data, but extend measurement time.
Select the average cycle among 1/2/4/8. Defaults to 1.
- **Window (Window Selection)**
Sets the type of window used in FFT processing among Hanning/ Rectangular/ Flat top.
Defaults to Hanning.
- **OK button**
Sets the measuring condition and returns to measurement screen.
- **Cancel button**
Without setting the measuring condition and returns to the measuring condition.
- **Default Value button**
Returns the all setting to default value.

[Function of hard key button]

A button	:Confirms the measuring condition and returns to the measurement screen.(OK button)
B button	:Without confirming, returns to the measurement screen (Cancel button)
D button	:Returns the setting to the default value (default button)
E button (Up/Down)	:Focus moves.
E button (Center)	:Executes the function of the focus button.

To start the FFT & Waveform analysis measurement

Place the vibration pickup in the correct measuring position and tap the **Start** button or press the hardkey **button A** on the Pocket PC's bottom left to begin the measurement.

A Status indicates when the measurement is done and prompts you to wait for the graph to display.

!Caution: If Start button is tapped, the measurements start immediately. After pickup is pressed on the measuring point, start the measurement.

FFT Spectrum analysis

Information on the FFT analysis screen includes:

FFT Spectrum analysis screen

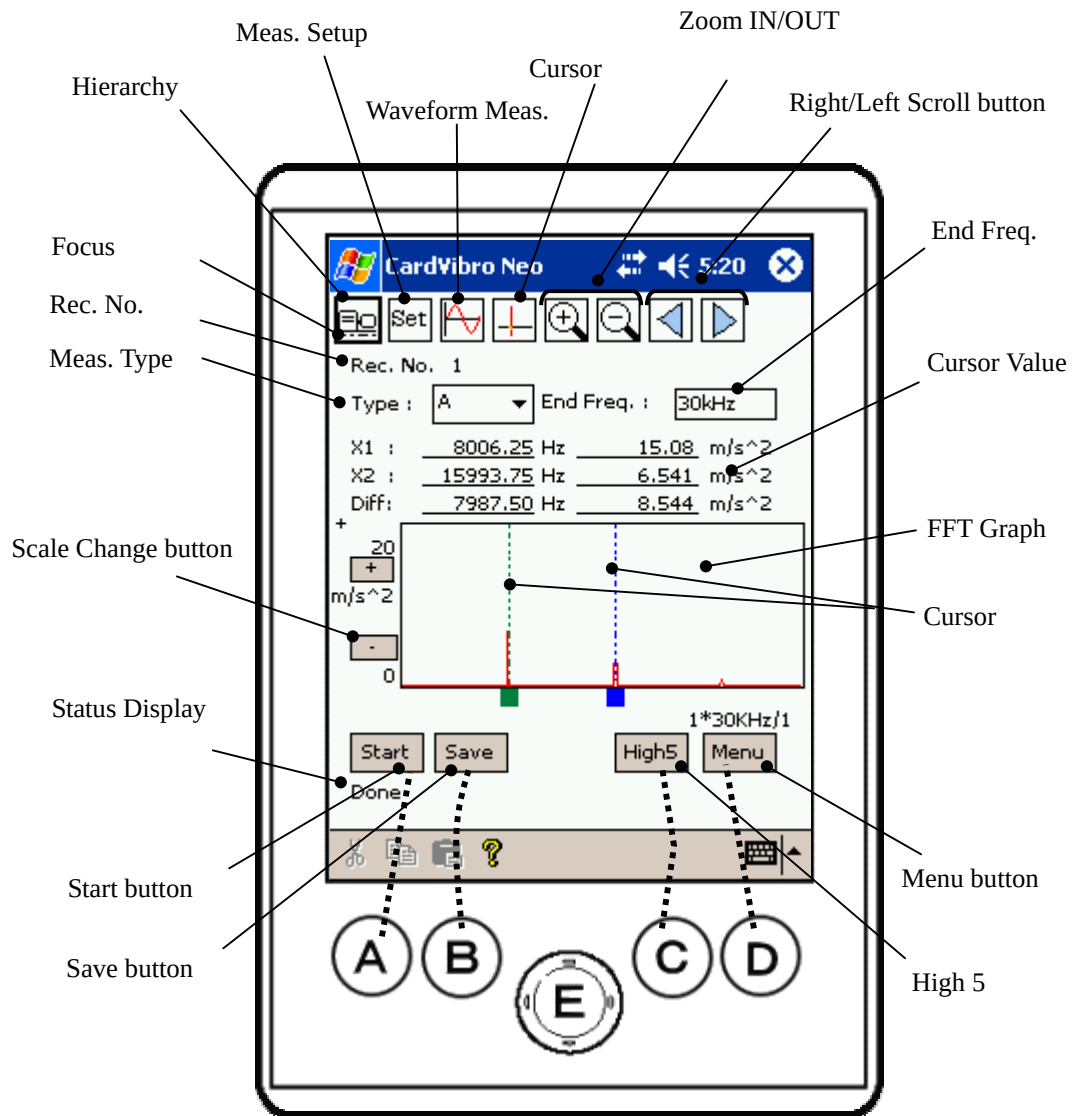


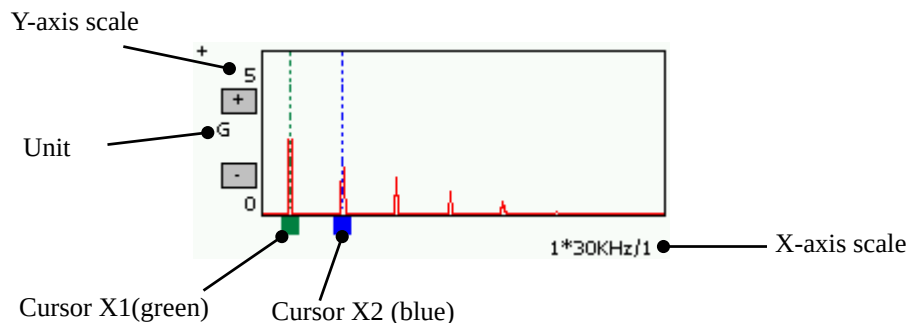
Fig:FFT Analysis screen

[Display Item]

- **Hierarchy (Measuring Point List) button**
Displays the hierarchy of measuring point
- **Meas. Setup button (Measuring Condition Setting)**
Displays the measuring condition setting screen.
- **Waveform Measurement button**
Displays WV analysis screen.

- **Cursor button**
Displays 2 lines of cursor. Displays the indication value at cursor position.
- **Zoom in/out Display button**
Changes the X-axis scale to be the suitable scale.
 button magnifies the graph to x2 times.
 button reduces the graph to x1/2 times.
- **Right/ Left Scroll button**
Scrolls the graph in right and left. It is available when graph is magnified.
 button scrolls the graph by 1-screen to left.
 button scrolls the graph by 1-screen to right.
- **Rec. No.**
Control No. of measurement data. Automatically assigned in sequence for saved measurement.
- **Meas. Type**
Sets the measuring type among A/ V/ D/ E1~E4.
- **End Freq. (Frequency Selection)**
Selects the frequency range.
!Information: Tap Set button to set **Meas. Type** and **End Freq.** on the Meas. Setup screen. In general, Meas. Type and End Freq. used frequently can be set on the measurement screen.
- **Cursor Indication Value**
Indicates the value at cursor position while cursor is displayed.

X1	:Indication value of green cursor
X2	:Indication value of blue cursor
Diff	:Difference between [X1 value] and [X2 value]
- **FFT Graph**
Displays FFT graph. X-axis indicates the frequency and Y-axis does the level of each meas. type.



X - axis scale - Displays the displayed spectrum's x axis frequency range.
 Y - axis scale - Displays the spectrum's y axis amplitude range.

- **Change of Y-axis Scale**

Displays Y-axis with the change of scale

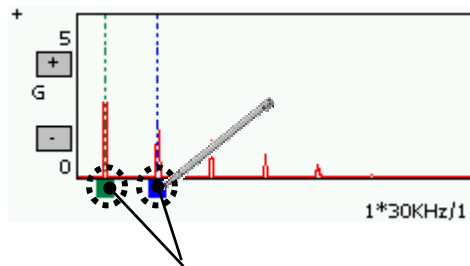
 : Scale magnifies.

 : Scale reduces.

- **Cursor**

Cursor moves with the drag by stylus. The indication value at cursor position can be confirmed.

Drag..... The operation to drag on touch screen by stylus.



With the drag of this part, cursor moves.

- **Start button**

Starts the measurement.

- **Save button**

Displays the Save Data screen.

- **High 5 button**

Displays the five highest amplitude frequency components

- **Menu button**

Displays the main menu screen.

- **Status Display**

Displays the measurement status as [Start Meas.], [Busy...], [Done] etc.

- **Focus**

Focus locates on the button selected by cursor button E Up/Down.

[Function of hard key button]

A button	:Starts the measurement. (Start button)
B button	:Displays the Save Data screen (Save button)
C button	:Displays High 5 screen (High 5 button)
D button	:Displays the main menu screen (Menu button)
E button (Up/Down)	:Focus moves.
E button (Center)	:Executes the function of the focus button.

Displaying the Highest Five Frequency Components

The **FFT Meas.** screen's **High5** button identifies and displays frequency and amplitude information for the FFT's five highest amplitude frequency components, and allows you to quickly place the FFT cursor at one of these frequencies.

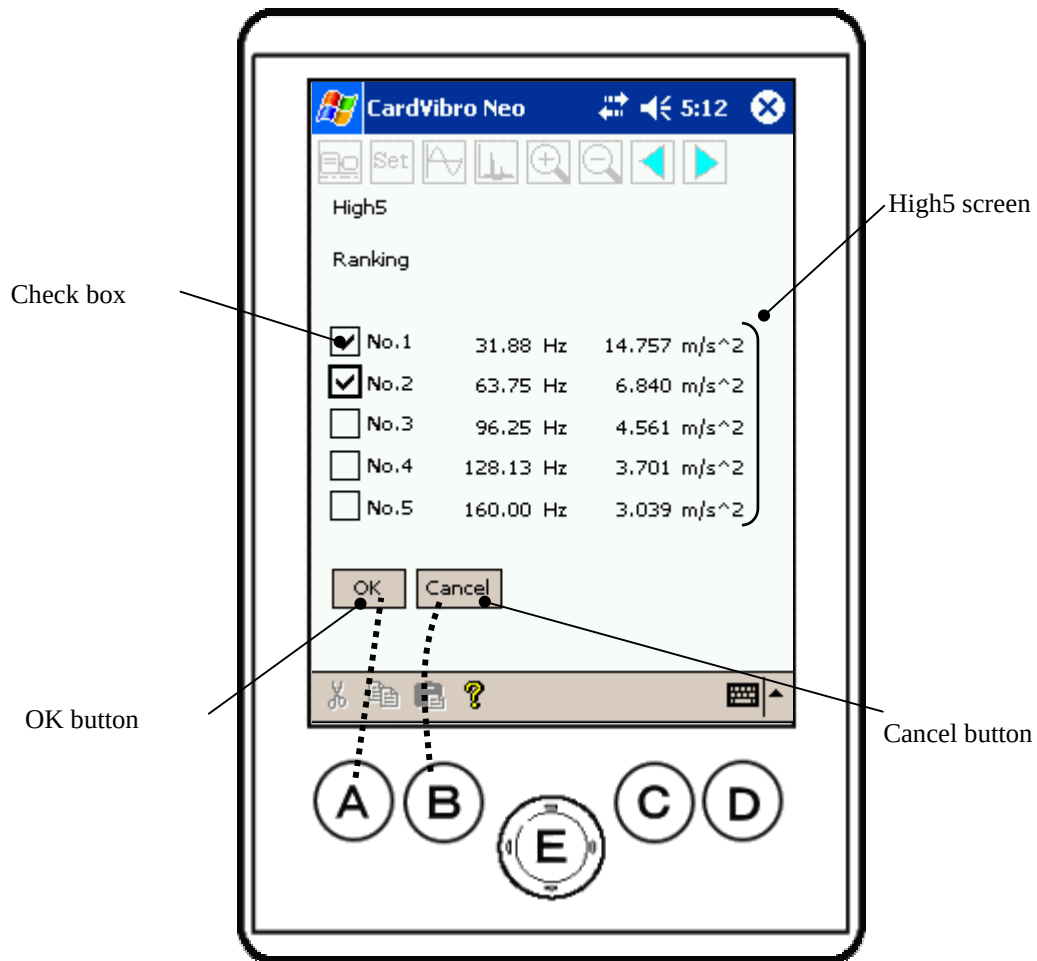


Fig: High 5 screen

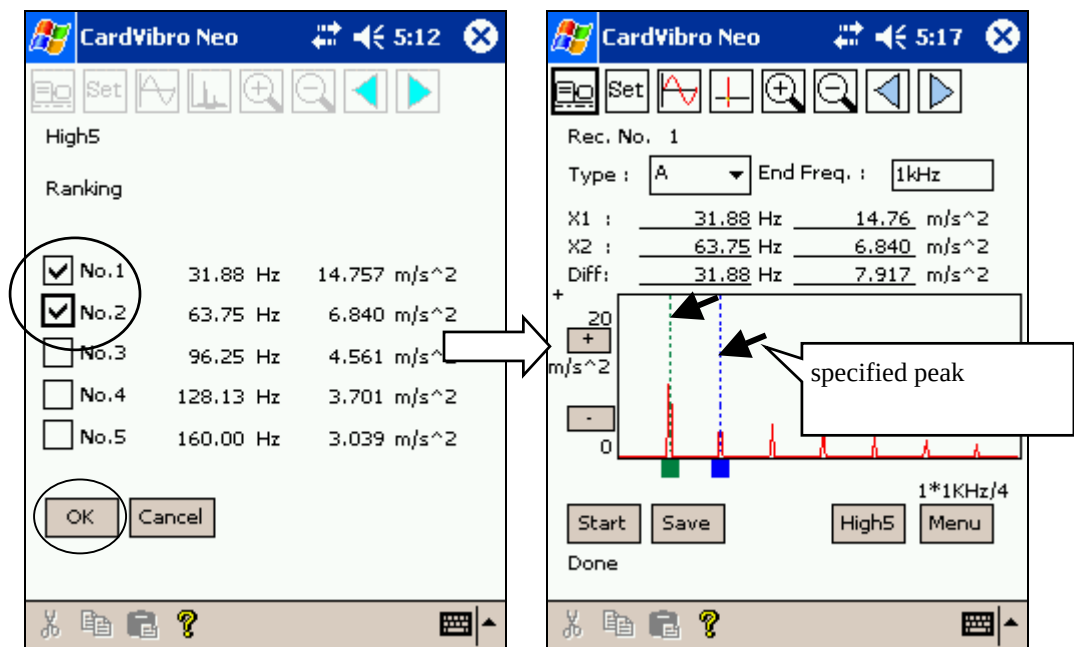
[Display Item]

- **High5 screen**

Lists up the frequency and amplitude information for the FFT's five highest amplitude frequency components.

- **Check Box**

On the High5 screen, enable the checkbox next to the frequency on which you wish to place the cursor, and tap OK. The FFT analysis screen re-displays, with the cursor positioned on the specified peak.



- **OK button**
Returns to the FFT measurement screen. Cursors move to the specified frequency, if checked on the checkbox.
- **Cancel button**
Returns to the FFT measurement screen without doing.

[Function of hard key button]

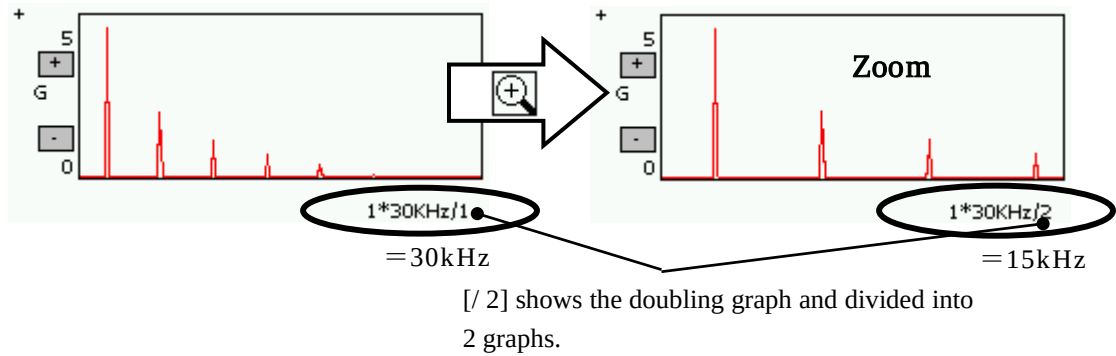
- A button :Returns to the FFT measurement screen.
Cursors moves to the frequency, if checked on the checkbox.(Ok button)
- B button :Returns to the FFT measurement screen without doing (Cancel button)

Using Zoom to Change X – Scale

Tap  button to magnify the graph to x2 times.

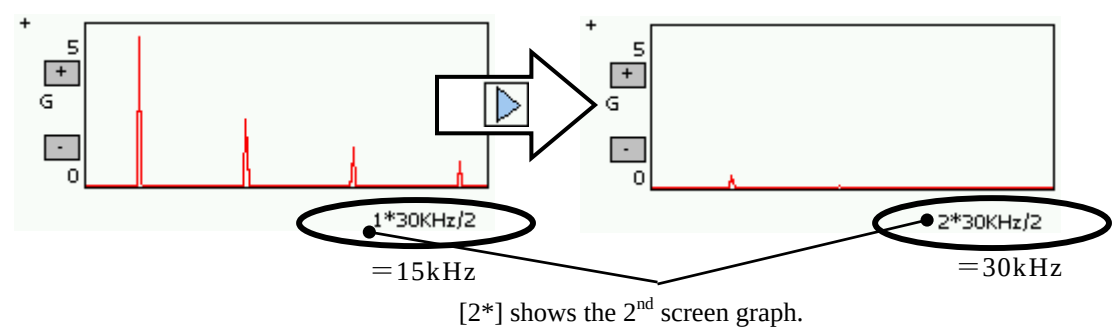
(With every tapping, it will magnify by x2 times.)

Ex.



Tap  button at graph zoomed condition to display the hidden part of graph with scrolling into right.

Ex.



In reverse,  button reduces the graph x1/2 times.

 button scrolls the graph to left direction.

Using +/- button to Change Y - Scale

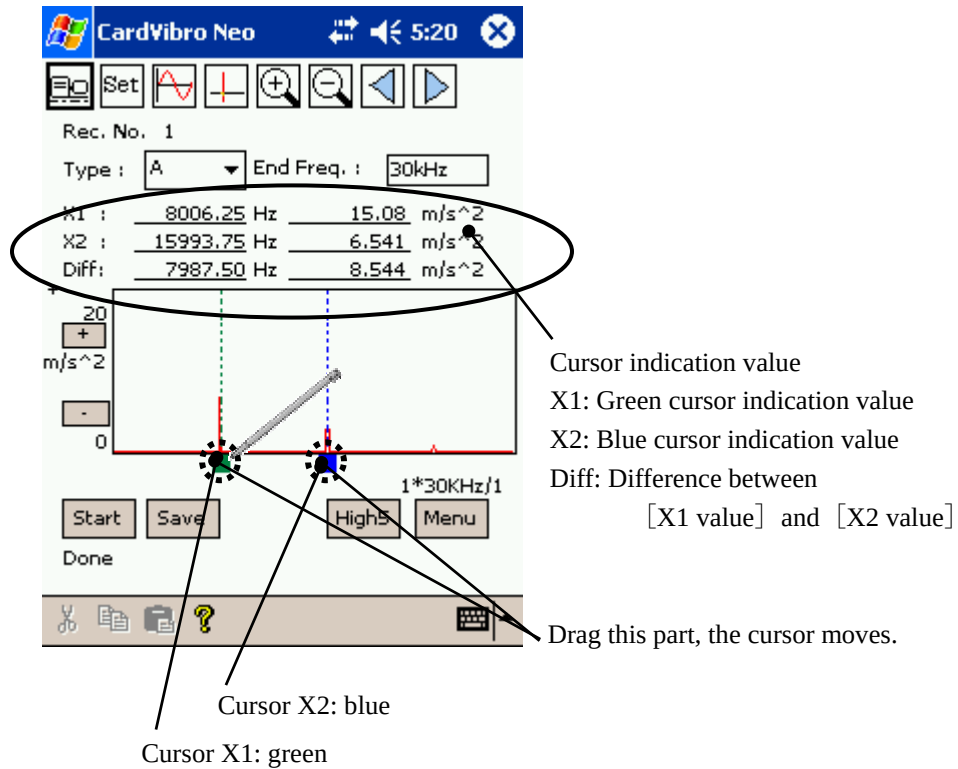
Tap  button to displays Y-scale with changing scale.

 :Scale magnifies.

 :Scale reduces.

Using the FFT Spectrum Dual Cursor

Tap  button to display the cursor and confirm the indication value at cursor position.



Saving the FFT Measurement

To save the measurement results:

Tap **Save** button to save the measurement data after completion of the measurement and save from **Save Data** screen.

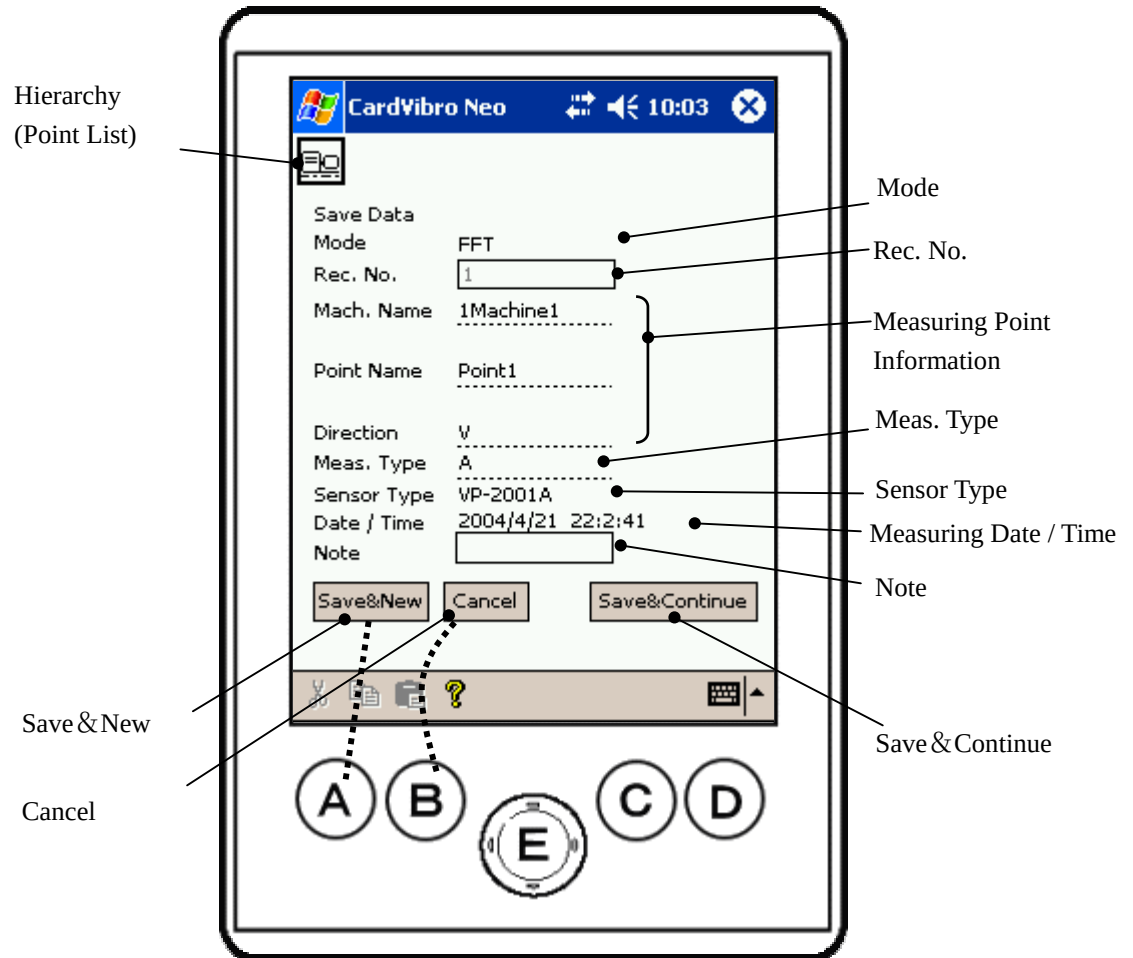


Fig: FFT Analysis DataSave screen

[Display Item]

- **Mode**
Displays the kind of measurement mode. (FFT analysis is displayed as FFT.)
- **Rec No.**
Displays the control number of measured data. The Data No is assigned automatically in sequence for saved measurement data.
- **Measuring Point Information**
Displays the measuring point information as Machine name/Point name/Detecting direction etc. Select the measuring point information from Hierarchy (measuring point list) and saves it related with measured data.
Resistor the measuring point list at **Edit Hierarchy** in Utilities.

- **Hierarchy**
Displays the measuring point list screen. (Refer to the chapter for hierarchy as for the description of the hierarchy.) Relates the Measurement point with the measured data.
- **Meas. Type**
Displays the measured type.
- **Sensor Type**
Displays the type of measured pickup.
- **Date / Time**
Displays the measured date and time.
- **Note**
Enter a note to store with the data (e.g. noisy, odor, leak, etc.).
It can be inputted up to 50 byte.
- **Save & New button**
Tap this button to save in database. After saving, the new measurement screen will display.
- **Cancel button**
Returns to the measurement screen without save.
- **Save&Continue button**
Tap this button to save in database. After saving, returns to the screen of the measurement result.

[Function of hard key button]

A button	:Saves in database. After saving, displays the new measurement screen. (Save&New button)
B button	:Returns to the measurement screen without save (Cancel button)
D button	:Saves in database. After saving, returns to the screen with measurement result. (Save&Continue button)
E button (Up/Down)	:Focus moves.
E button (Center)	:Executes the function of the focus button.

Waveform analysis

Information on the WV analysis screen includes:

Waveform analysis screen

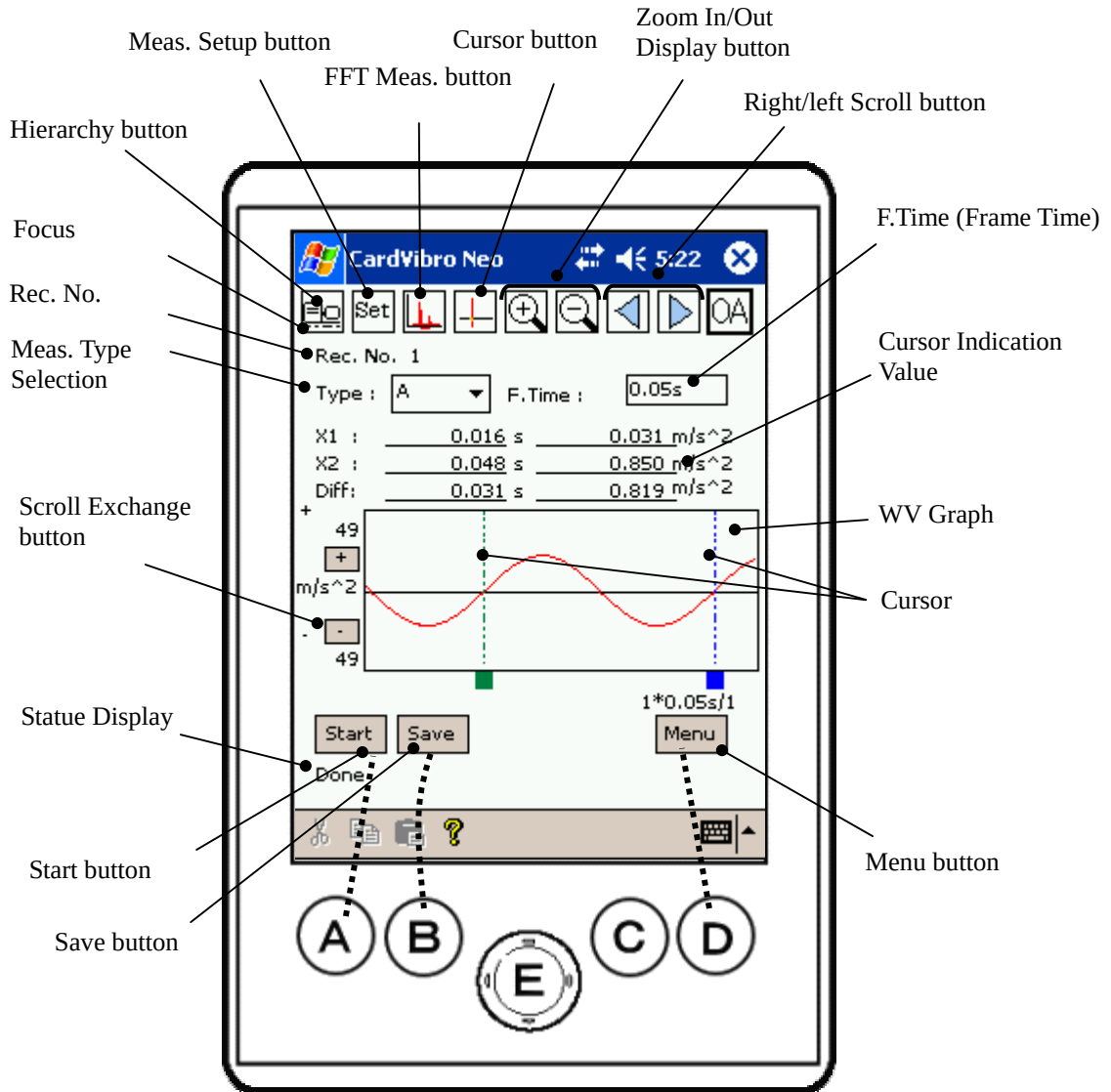


Fig :WV Analysis Screen

[Display Item]

- **Hierarchy button**
Displays the hierarchy of measuring point
- **Meas. Setup button**
Displays the measuring condition setting screen.
- **FFT Measurement button**
Displays FFT analysis screen.
- **Cursor button**
Displays 2 lines of cursor. Displays the indication value at cursor position.

- **Zoom In/Out Display button**

Changes the X-axis scale to be the suitable scale.



button magnifies the graph to x2 times.



button reduces the graph to x1/2 times.

- **Right/left Scroll button**

Scrolls the graph in right and left. It is available when graph is magnified.



button scrolls the graph by 1-screen to left.



button scrolls the graph by 1-screen to right.

- **Rec. No.**

Control No. of measurement data. Automatically assigned in sequence for saved measurement.

- **Meas. Type (Measurement Type Selection)**

Sets the measuring type among A/ V/ D/ E1~E4.

!Information: Tap Set button to set Meas. Type on the measuring condition setting screen.

The most frequently used mode can be set on the measurement screen.

- **F. Time (Frame time)**

Displays the graph frame time.

- **Cursor Indication Value**

Displays the indication value at cursor position while cursor appears.

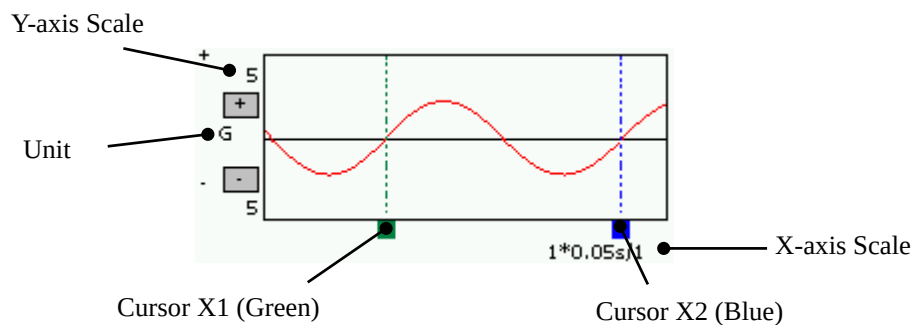
X1 :Indication value of Green cursor

X2 :Indication value of blue cursor

Diff :Difference between [X1 value] and [X2 value]

- **WV Graph**

Displays WV graph. X-axis shows the time and Y-axis does the level of each meas. type.



X – Scale - Displays the horizontal range of the displayed data.

Y – Scale - Displays the amplitude range of the displayed data.

- **Change of Y-axis Scale**

Displays Y-axis with the change of scale

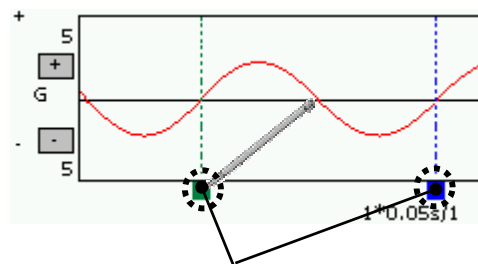
 : Scale magnifies.

 : Scale reduces.

- **Cursor**

Cursor moves with the drag by stylus. The indication value at cursor position can be confirmed.

Drag..... The operation to drag on touch screen by stylus.



With the drag of this part, cursor moves.

- **Start button**

Starts the measurement.

- **Save button**

Displays the Save Data screen.

- **Menu button**

Displays the main menu screen.

- **Status Display**

Displays the measurement status as [Start Meas.][Busy...][Done] etc.

- **Focus**

Focus locates on the button selected by cursor button E Up/Down.

[Function of hard key button]

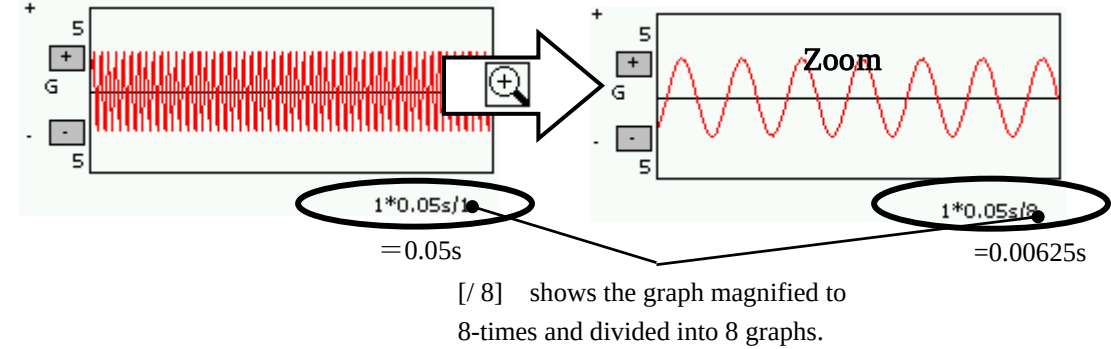
A button	:Starts the measurement (Start button)
B button	:Displays the save screen (Save button)
D button	:Displays the main menu screen (Menu button)
E button (Up/Down)	:Focus moves.
E button (Center)	:Executes the function of the focus button.

Using Zoom to Change X – Scale

Tap  button to magnify the graph to x2 times.

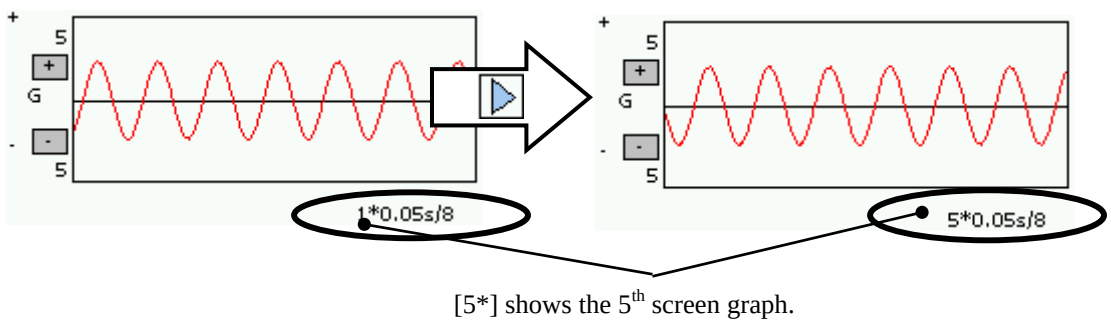
(With every tapping, it will magnify by x2 times.)

Ex.



Tap  button at graph zoomed condition, the hidden graph part can be seen with right scroll.

Ex.



In reverse,  button reduces the graph to half (x1/2 time).

 button displays the graph with scroll to left.

Using +/- button to Change Y – Scale

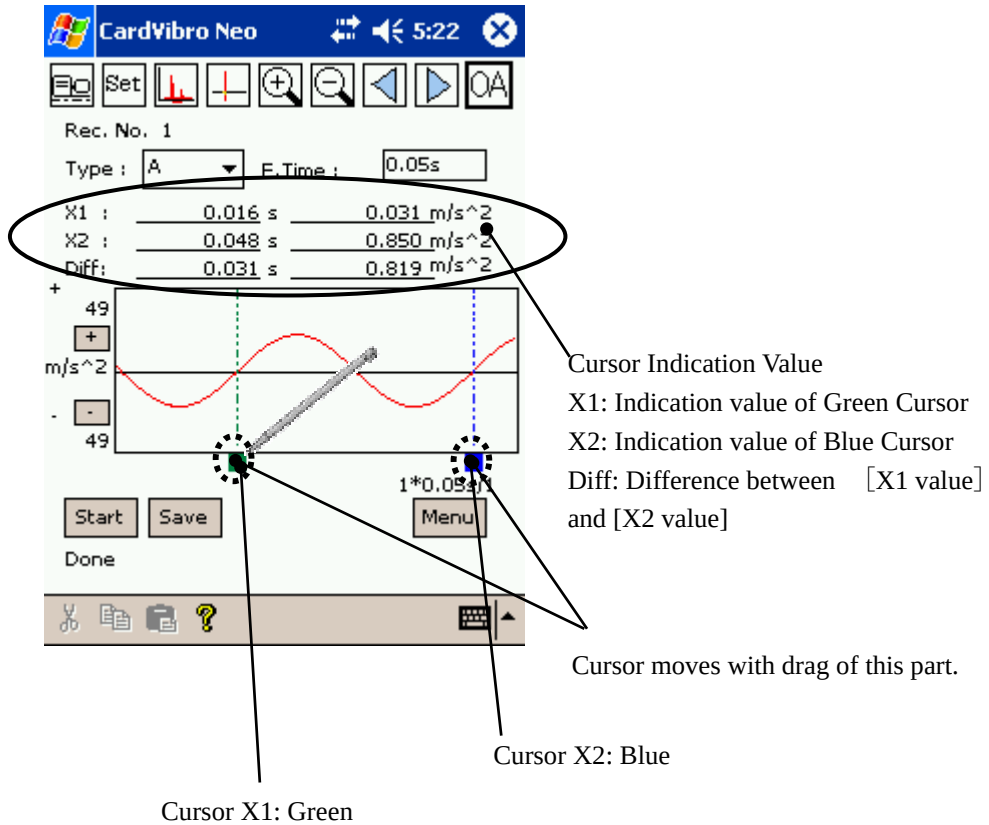
Tap   button to displays Y-scale with changing scale.

 :Scale magnifies.

 :Scale reduces.

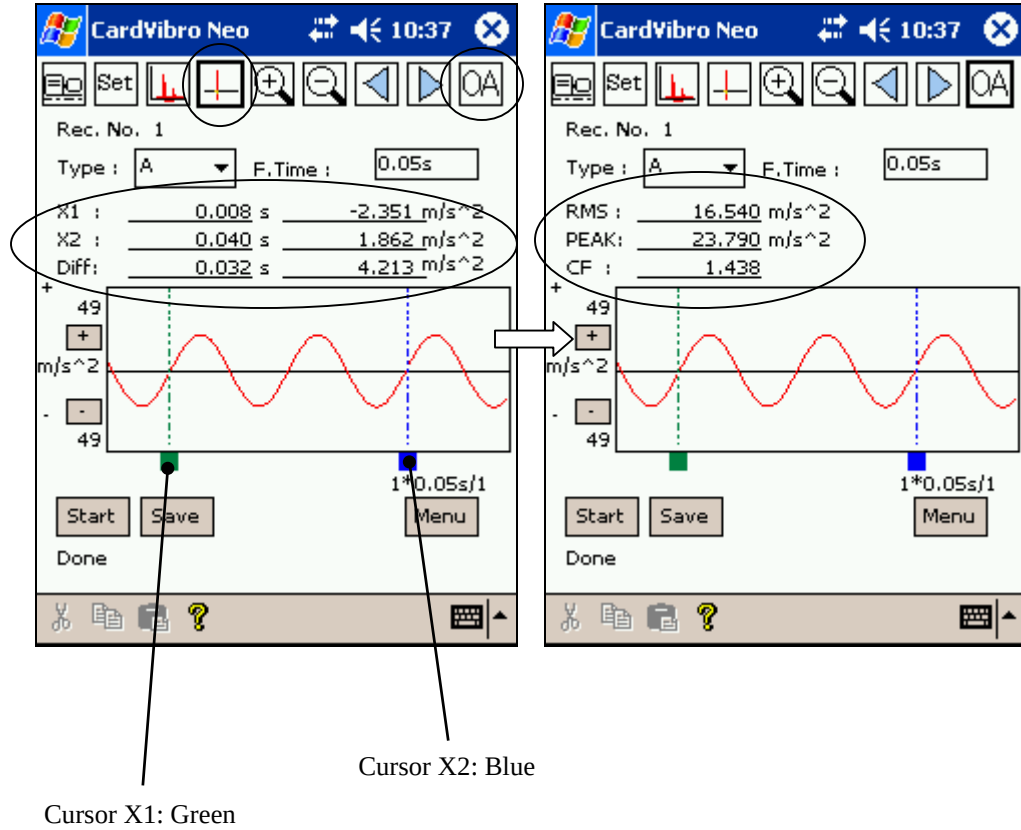
Using the Waveform Dual Cursor

Tap  button to display the cursor and confirm the indication value at cursor position.



Display of Overall value between Cursor

Tap  button at Cursor indicated condition, it shows Overall value between X1 cursor and X2 cursor.



Saving the Waveform Measurement

To save the measurement results:

Tap the **Save** button after the measurement to display the Save Data screen.

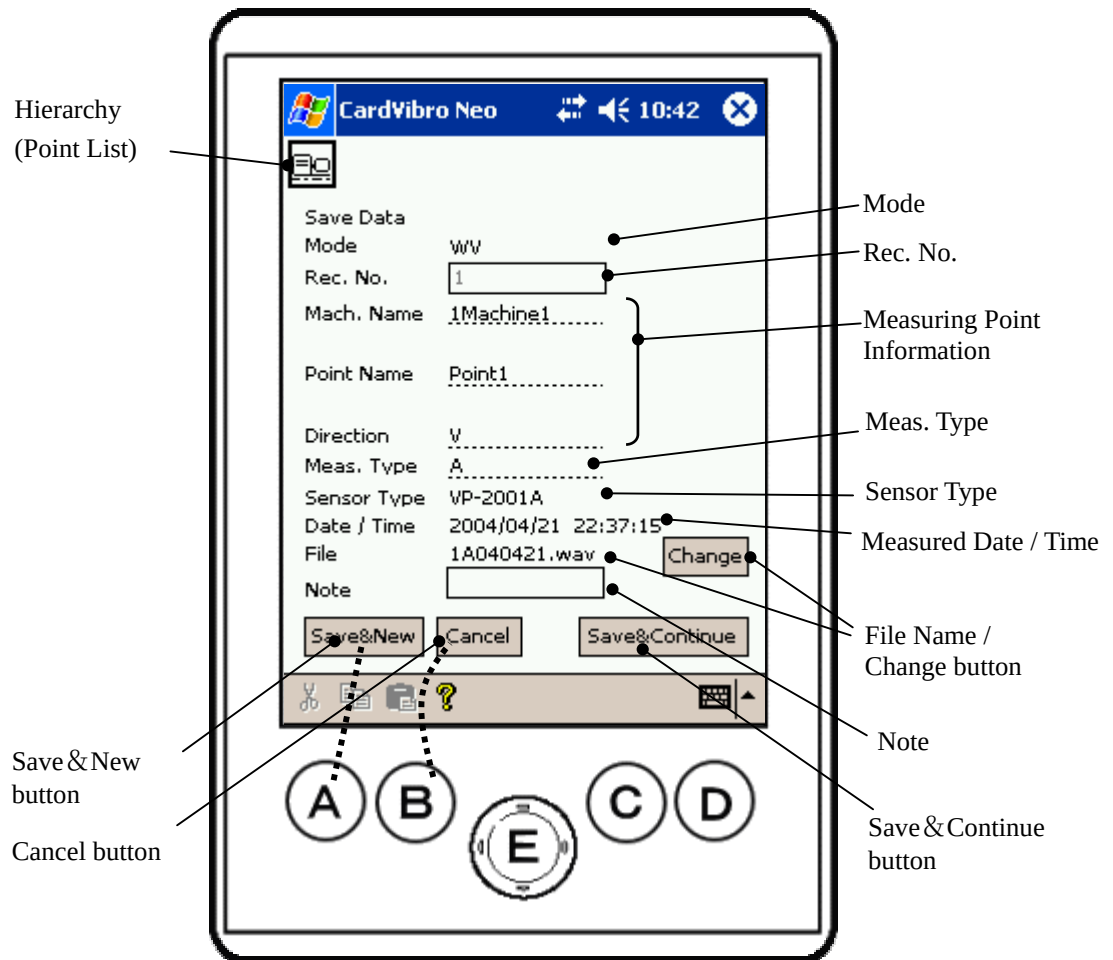


Fig: Waveform Save Data screen

[Display Item]

- **Mode**
Displays the kind of measurement mode. (Waveform measurement is displayed as WV.)
- **Rec No.**
Displays the control number of measurement data. The number is assigned automatically in sequence for saved measurement data.
- **Measuring Point Information**
Displays the measuring point information as Machine name/Point name/Detecting direction etc. Select the measuring point information from measuring point list and saves it related with measured data.
Resistor the measuring point list at **Edit Hierarchy** in Utilities.

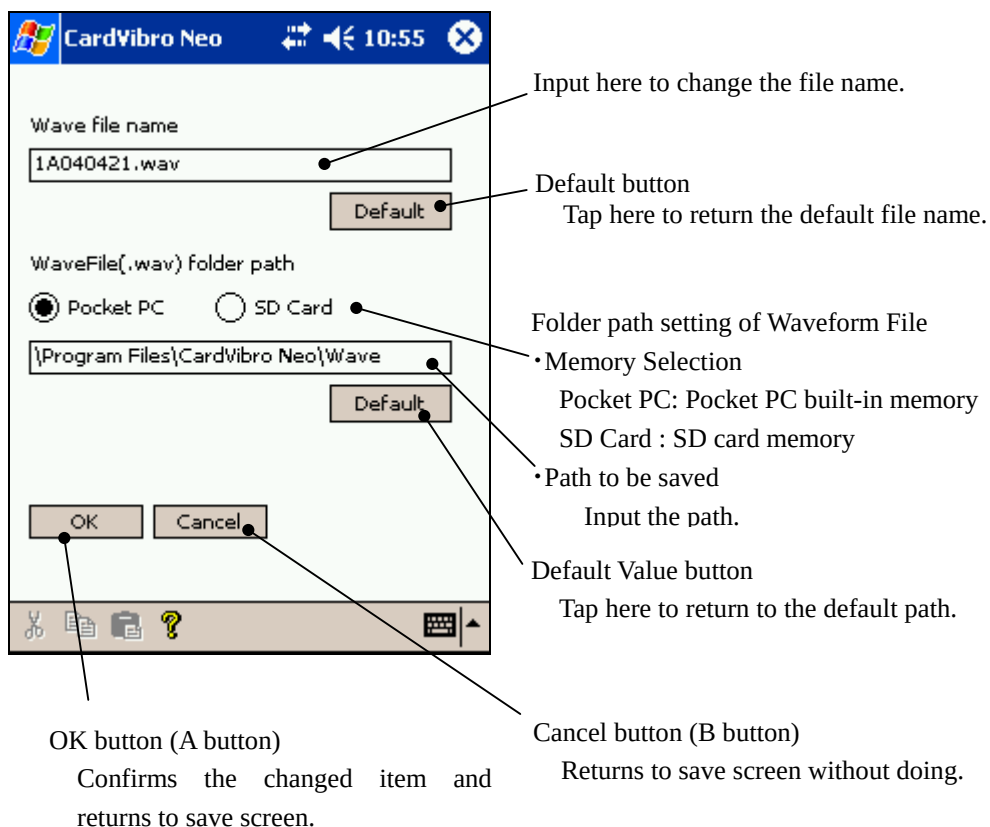
- **Hierarchy button**
Displays the measuring point list screen. (See chapter of hierarchy in detail.)
- **Meas. Type**
Displays the measured type.
- **Sensor Type**
Displays the type of measured pickup.
- **Date / Time**
Displays the measured date & time.
- **File (Save File Name)**
Displays the file name of waveform data to be saved. At default, file name is assigned automatically.

Ex. Waveform data of

Rec. No.	8
Meas. Type:	A
Measured date:	2003/09/17 (September 17,2003)

is saved, file name will be 8A020917.wav.

In case to save the file with the different name, tap **Change** button. File name can be changed on the file name change screen.



!Information: Tap **Save** button on Save Data screen to save waveform file. When OK button is tapped in this screen, it is not saved.

- **Note**
Enter a note to store with the data (e.g. noisy, odor, leak, etc.).
It can be inputted up to 50 byte.
- **Save & New button**
Tap this button to save in database. After saving, the new measurement screen will display.
- **Cancel button**
Returns to the measurement screen without save.
- **Save&Continue button**
Tap this button to save in database. After saving, returns to the screen of the measurement result.

[Function of hard key button]

A button	:Saves in database. After saving, displays the new measurement screen. (Save&New button)
B button	:Returns to the measurement screen without save (Cancel button)
D button	:Saves in database. After saving, returns to the screen with measurement result. (Save&Continue button)
E button (Up/Down)	:Focus moves.
E button (Center)	:Executes the function of the focus button.

How to use the PU OUT connector

- Optional earphone or output is connected with PU OUT  connector.
- Tap the Measurement button on measurement screen to output waveform.
- Takes out the voltage magnified by the range which pickup input signal is measured. Ex.
In the FFT/WV measurement, select Mode, Acceleration A. The voltage takes out with the magnification ratio of range
10m/s² (x100 times), 50m/s² (x20 times), 200m/s² (x5 times),
1000m/s² (x1 times).
- Connector shape: 2.5φ mini jack
- Connect earphone and output cable etc.

Notes

- The Note for the machine to be controlled and measuring point can be recorded.

The Note for every machine and every measuring point is saved.

To use Notes:

Tap the Main Menu display's Notes button.

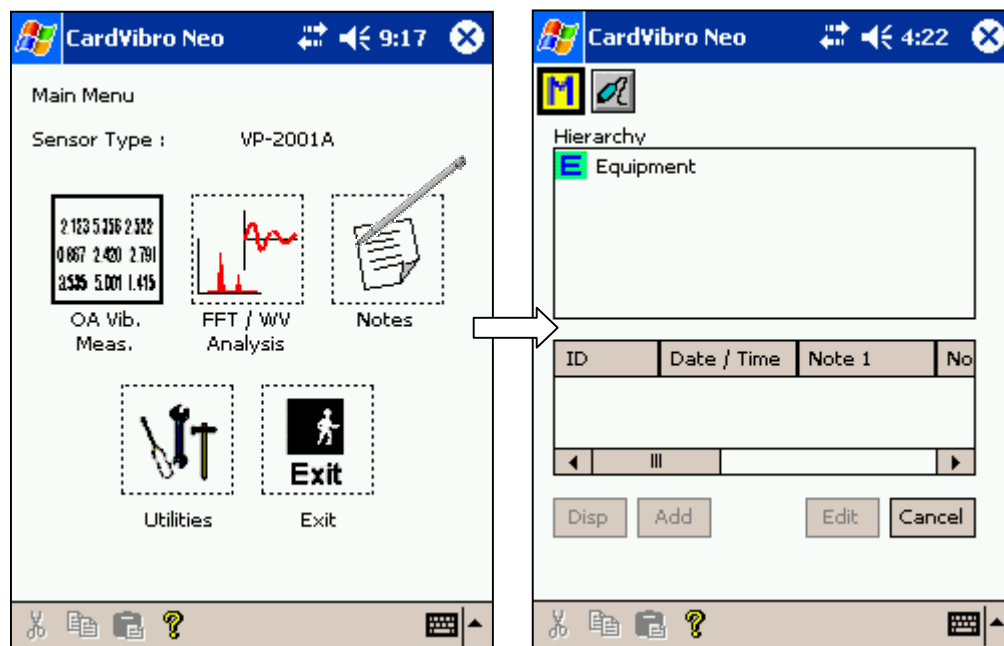


Fig: To use Notes

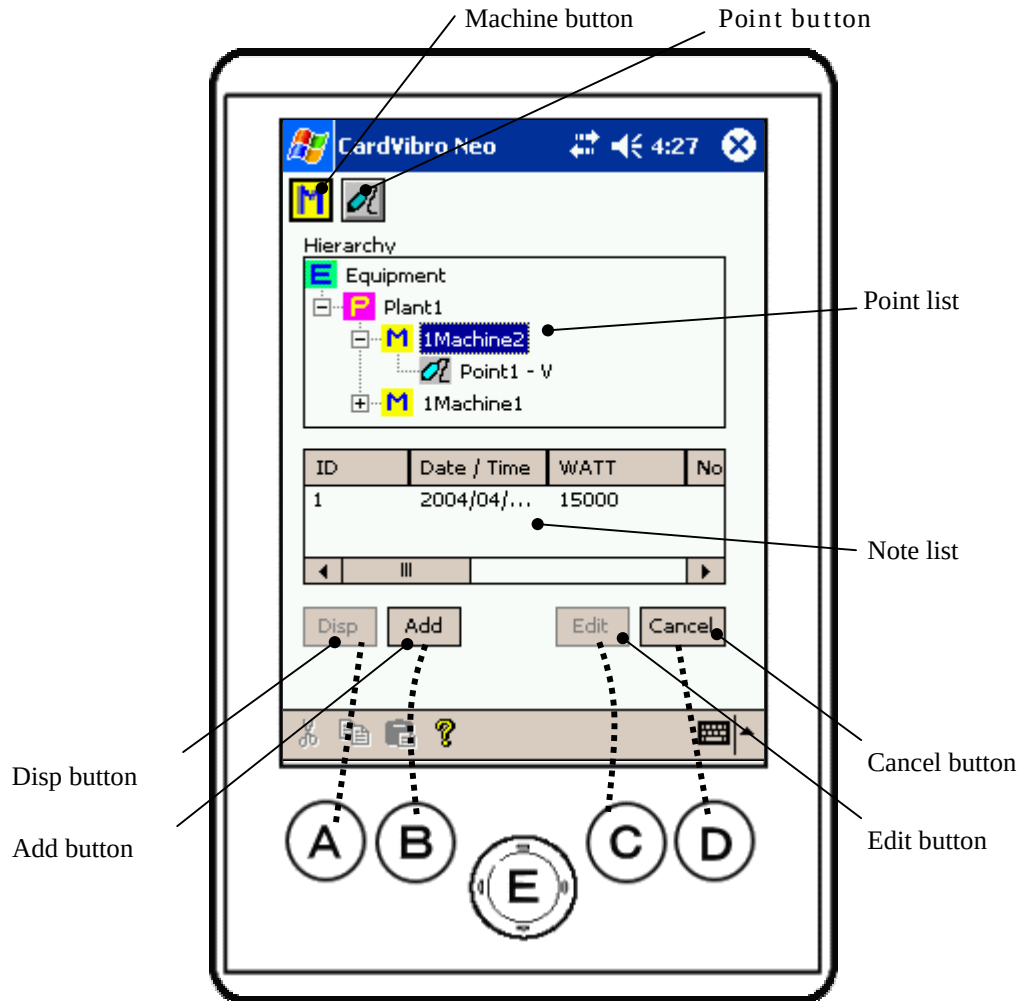


Fig: Note screen

[Display Item]

- **Machine button**
While Machine button is pressed, Note List displays Note regarding Machine selected by tree.
- **Point button**
While Point button is pressed, Note List displays Note regarding Measuring point selected by tree.
- **Point list**
Displays Measuring point list.
- **Note list**
Displays either Machine Note or Point Note.
- **Disp button**
Displays Note on the date selected by Note list.
- **Add button**
Displays the new screen to add Note.
- **Edit button**
Displays the screen to edit Note on the date selected by Note list.

- **Cancel button**
Displays the main menu screen.

[Function of hard key button]

- A button : Displays Note on the date selected by Note list (Disp button)
- B button : Displays screen to add new Note (Add button)
- C button : Displays the screen to edit Note on the data selected by Note list. (Edit button)
- D button : Displays the main menu screen. (Cancel button)

To add the Note:

Tap the Add button to display the screen to add Note of Machine or Measuring point selected by Point list tree.

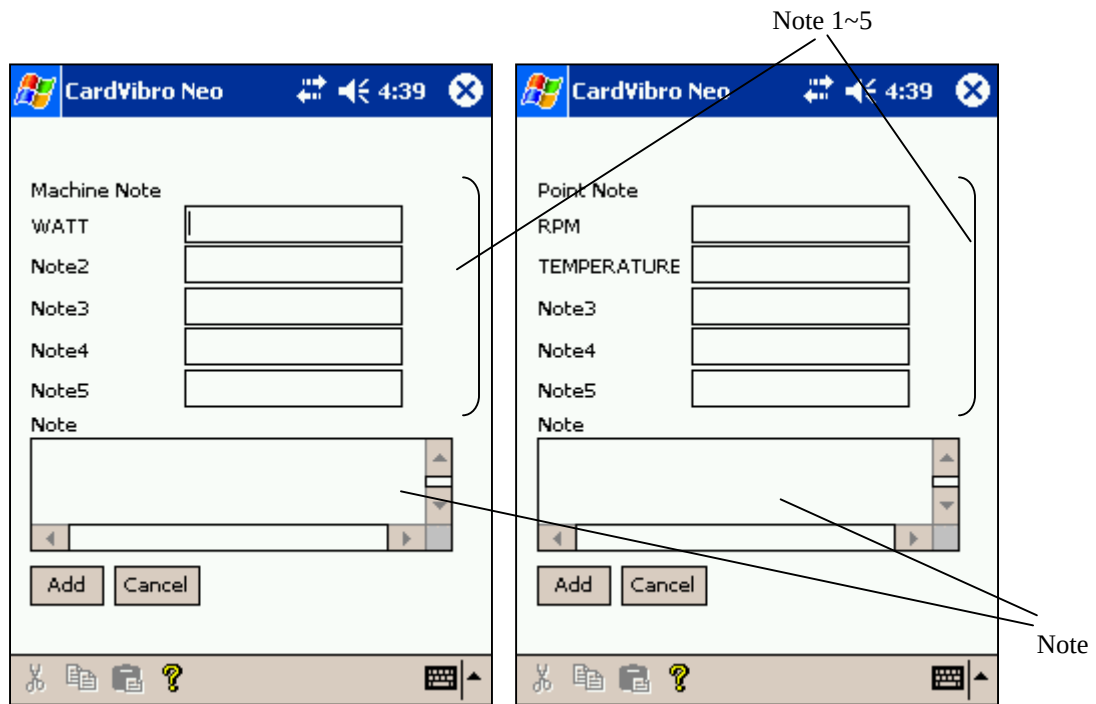


Fig: Screen to add Machine Note

Fig: Screen to add Point Note

Input the Note.

- Note1~5 column : Maximum memory is 30byte
- Note column : Maximum memory is 120byte

Tap the **Add button** to add.

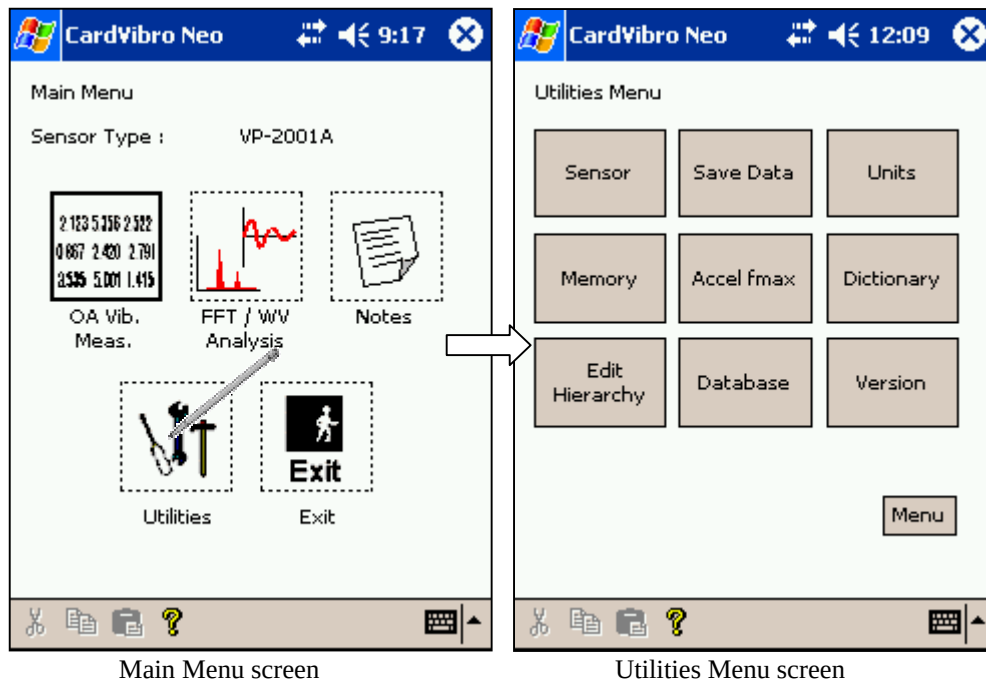
!Information: Once it is added, the delete is impossible on Pocket PC.
Please take care when registered.

Using the Utilities Menu

Use **Utilities Menu** options to access various system setup screens, and to use CardVibro Neo accessory applications.

To access the Utilities Menu:

Tap the Main Menu's **Utilities** button. The **Utilities Menu** displays.



Utilities Menu operations are initiated with on-screen buttons. Each is described below.

Utilities Menu screen

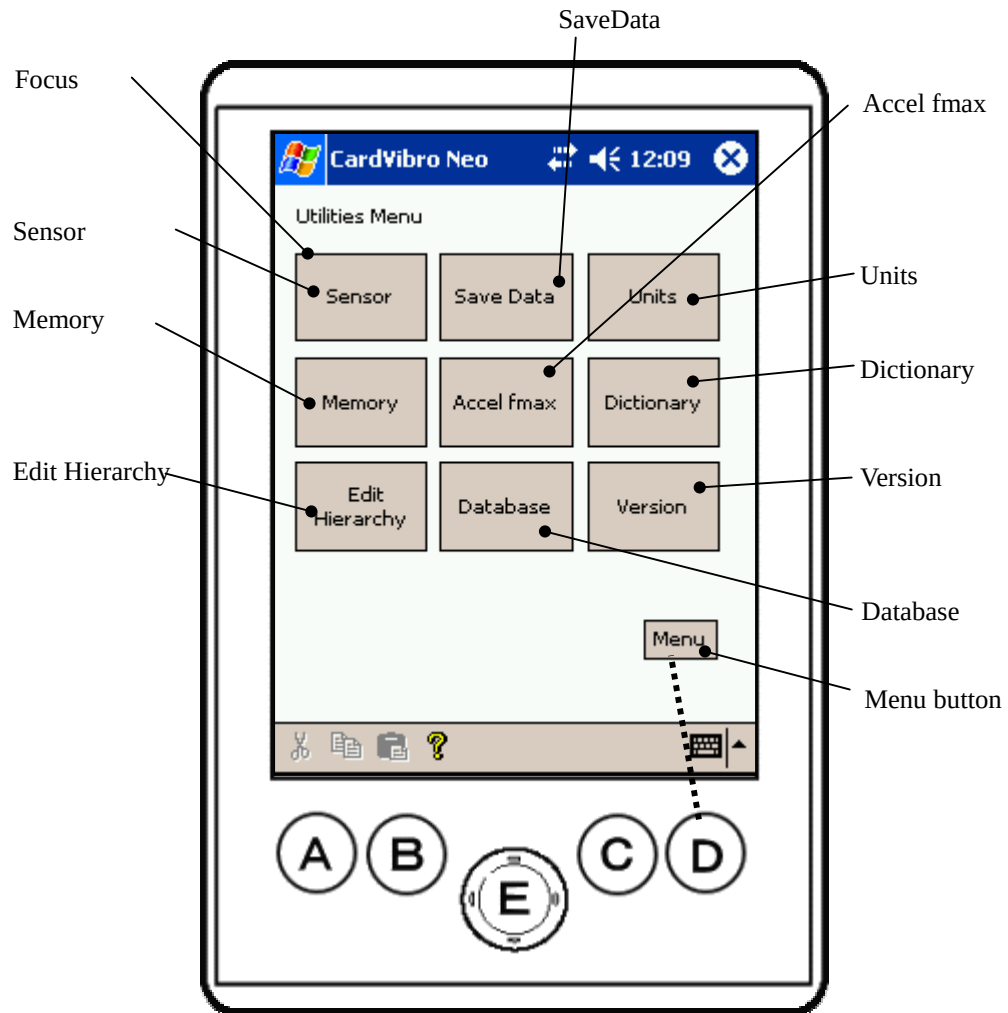


Fig:Utilities Menu screen

[Display Item]

- **Sensor**
Displays the **Sensor Sensitivity Setting** screen.
- **Memory**
Displays the **Memory Information** screen, which shows available memory.
- **Edit Hierarchy**
Displays the **Edit Hierarchy** screen.
- **Save Data**
Displays the **Saved Data List** screen.
- **Accel fmax**
Displays the **Accel fmax** screen.
- **Database**
Displays the **database path setting** screen.

- **Units**
Displays the **Meas. Units Setting** screen.
- **Dictionary**
Displays the mini-dictionary of vibration terms.
- **Version**
Displays the CardVibro Neo version information screen.
- **Menu button**
Displays the **Main menu** screen.
- **Focus**
Focus locates on the button selected by the cursor button E (Up/Down).

[Function of hard key button]

D button	:Displays the Main menu screen (Menu button)
E button (Up/Down)	:Focus moves.
E button (Center)	:Executes the function of the focus button.

Sensor

Displays the **Sensor / Sensor Sensitivity Setting** screen, allowing you to specify the attached vibration sensor / pickup and its sensitivity.

Sensor / Sensor Sensitivity Setting screen

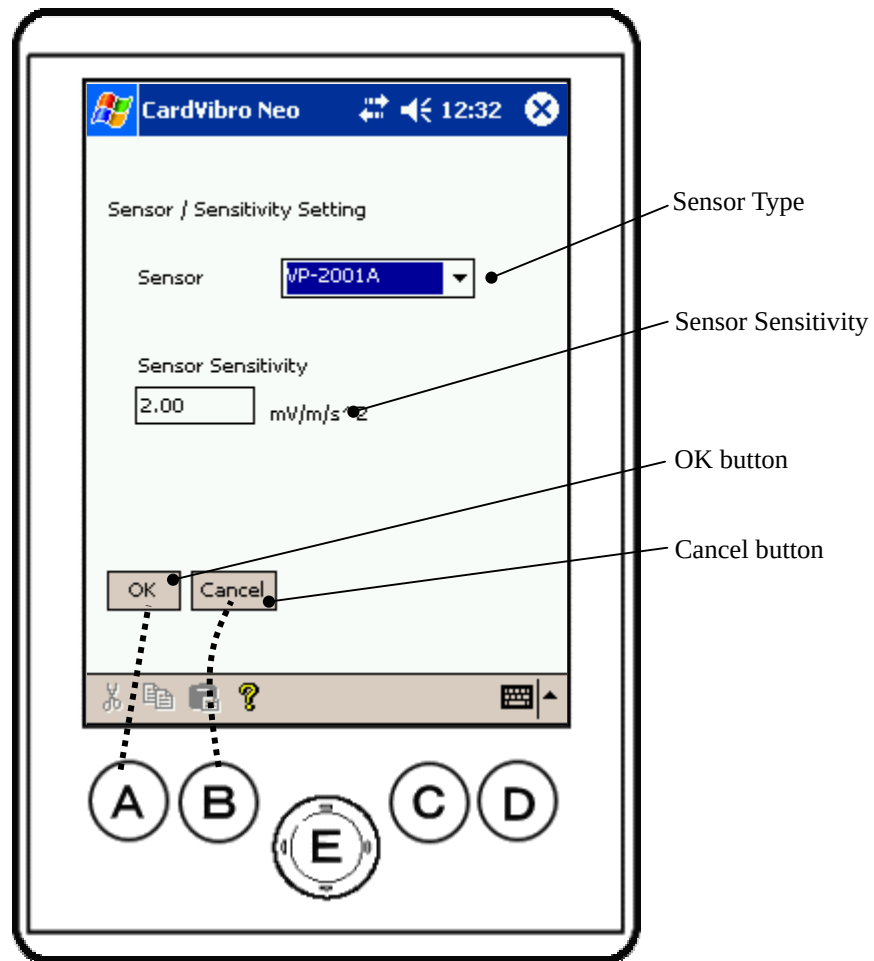


Fig:Sensor / Sensor Sensitivity Setting

[Display Item]

- **Sensor**
Select the appropriate sensor / pickup type from the Sensor drop down list.
- **Sensor Sensitivity**
Set the specified **Sensor Sensitivity** by entering the voltage value per unit. Reference the sensor's documentation for specific sensor sensitivity settings.
- **OK button**
Confirms the changed content and displays the **Utilities Menu** screen.
- **Cancel button**
Displays the **Utilities Menu** screen without confirming of the changed content.

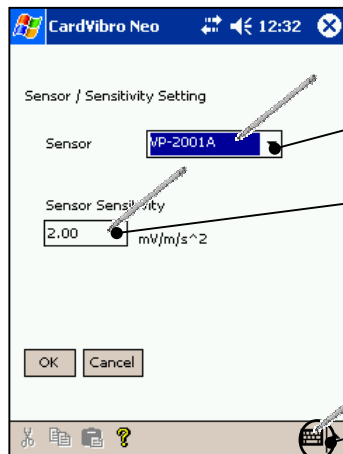
[Function of hard key button]

- | | |
|--------------------|---|
| A button | :Confirms the changed content and displays the Utilities Menu screen. (OK button) |
| B button | :Displays the Utilities Menu screen without confirming of the changed content. (Cancel button) |
| E button (Up/Down) | :Focus moves. |
| E button (Center) | :Executes the function of the focus button. |

To set the specified Sensor Sensitivity

- Select the appropriate sensor / pickup type from the **Sensor** drop down list.

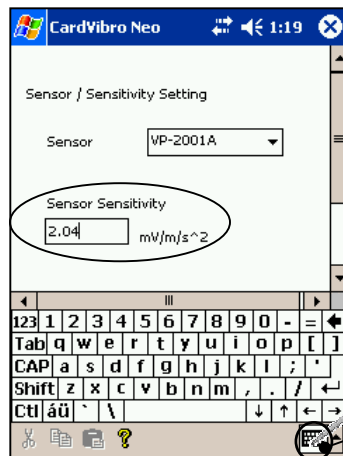
VP-2001A Accelerometer	2.0 mV/(m/s ²)
VP-2001V Velocity Pickup	4.0 mV/(mm/s)
VP-2001PS Piezo-resistive Acceleration Pickup	1000 mV/(m/s ²)
- Set the specified **Sensor Sensitivity** by entering the voltage value per unit. Reference the sensor's documentation for specific sensor sensitivity settings.



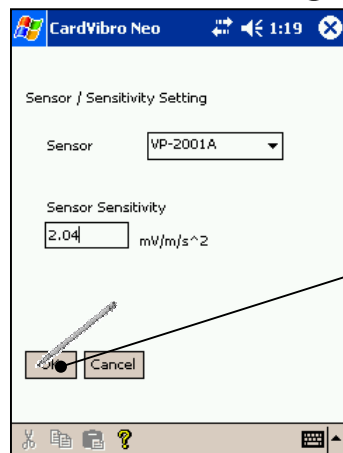
Selects the kind of used pickup.

Input the sensitivity value.

Tap here to display keyboard.



Tap here again to delete the keyboard after the input.



Tap the OK button to confirm the changed content, and displays the utility menu screen.

Memory

Displays the **Memory Info** screen, which shows available memory. The screen also shows the number of stored OA, FFT, and WV measurements.

Memory Information Screen

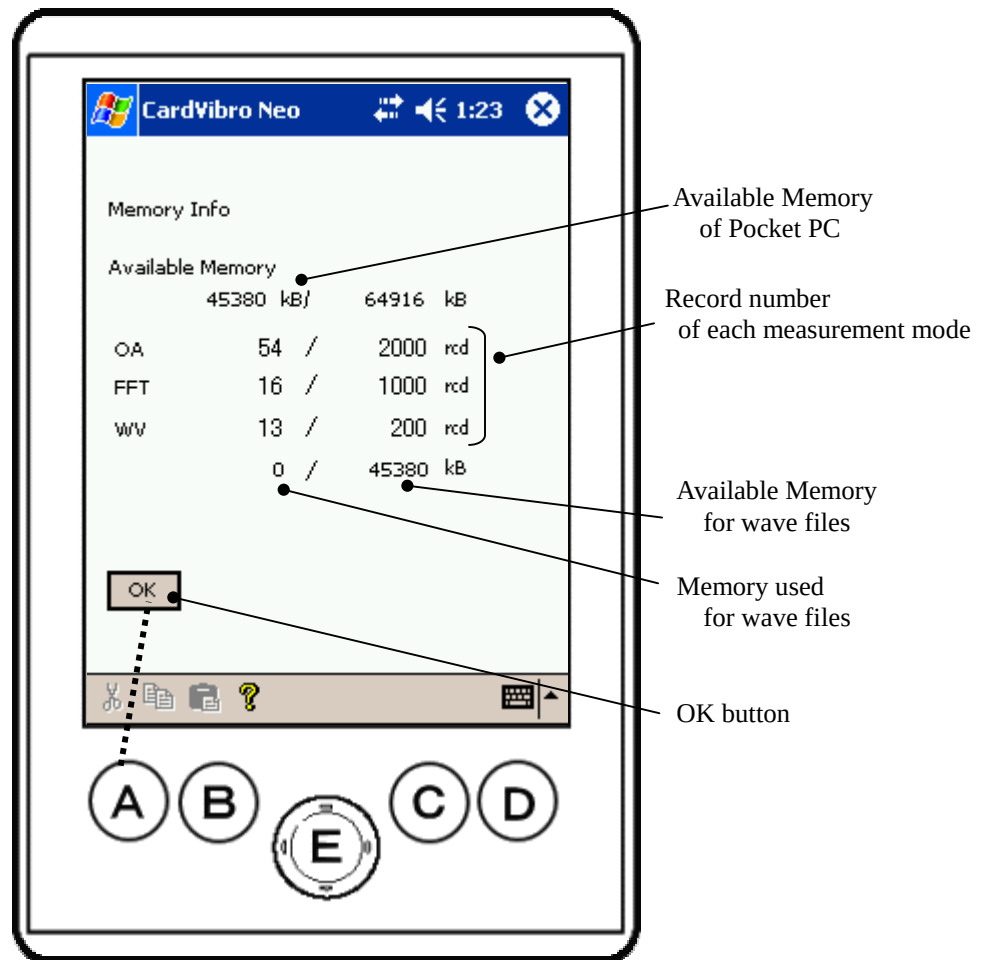


Fig: Memory Info screen

[Display Item]

- **Available Memory of Pocket PC**
Displays the available main built-in memory of Pocket PC.
- **Record number for each Measurement Mode**
Displays the record number of stored OA, FFT, WV measurement vs. the total records of each. For example, FFT 1/1000 rcd indicates the CardVibro Neo has one FFT measurement stored out of a possible 1000 FFT measurement capacity.
- **Available Memory for wave files**
Displays the Available Memory for wave files.

- **Memory used for wave files**
Displays the memory used for wave files.
- **OK button**
Returns to the **Utilities Menu** screen.

[Function of hard key button]

A button :Returns to the **Utilities Menu** screen (OK button)

Edit Hierarchy

Displays the **Edit Hierarchy** screen, which shows registered measuring point list.

In this screen, measuring points can be added.

Edit Hierarchy Screen

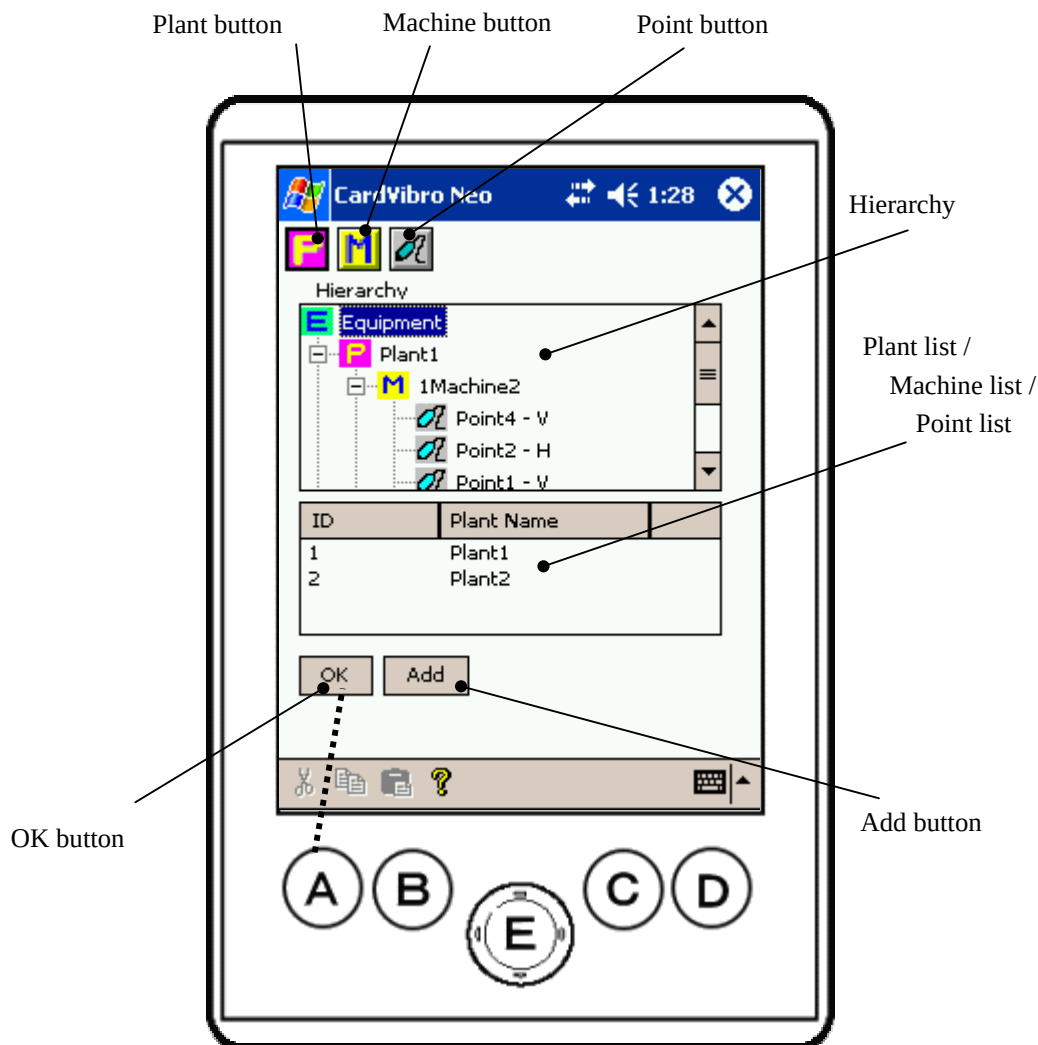


Fig:Edit Hierarchy screen

[Display Item]

- **Plant button**
Tap to display **Plant list**.
- **Machine button**
Tap to display **Machine list** of Plant selected by Tree.
- **Point button**
Tap to display **Point list** of Machine selected by Tree.

- **hierarchy**
Displays the registered point list in hierarchy.
- **Plant list / Machine list / Point list**
Displays Plant list / Machine list / Point list selected by    button.
- **OK button**
Returns to the **Utilities Menu** screen.
- **Add button**
Displays the Add screen of Plant / Machine / Point.

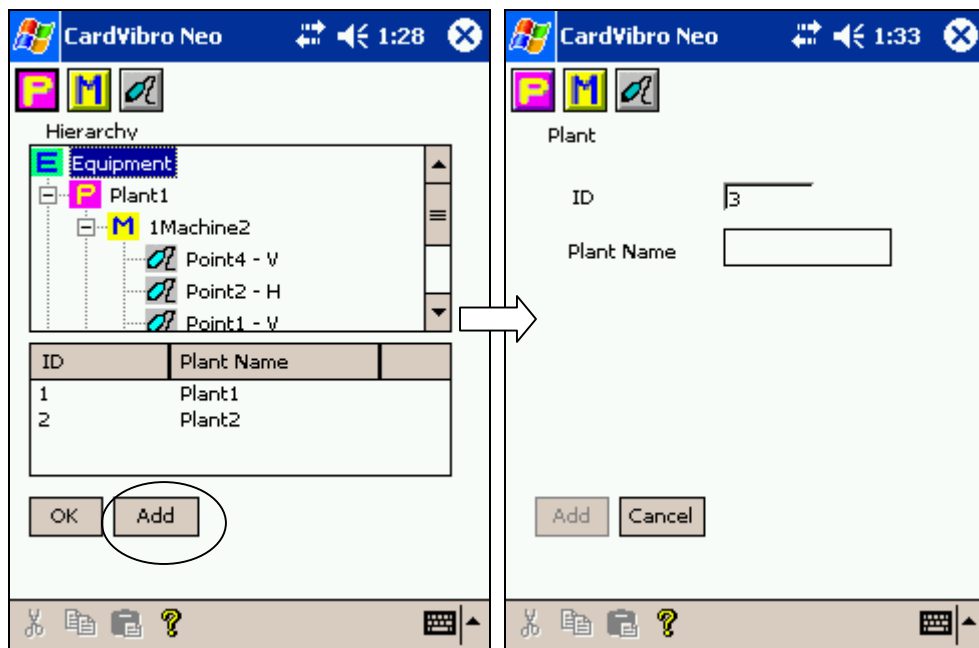
[Function of hard key button]

- A button :Returns to Utilities Menu screen(OK button)
 B button :Displays the Add screen of Plant / Machine / Point.
 (Add button)

Addition of Plant

Tap the Plant button.

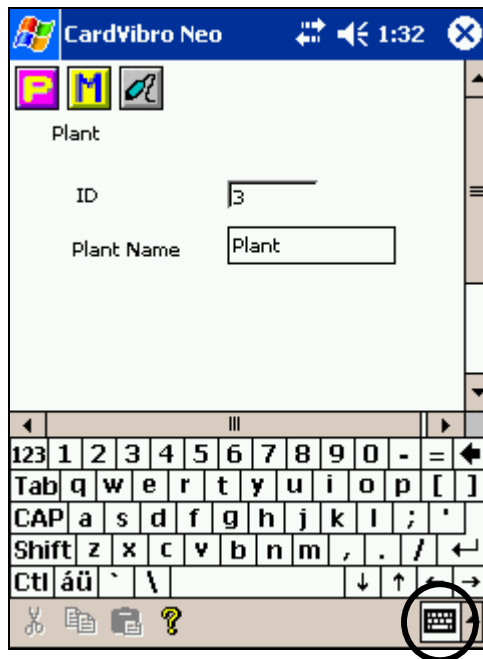
Select the **Equipment icon** on hierarchy and tap the **Add button** to display the Plant addition screen.



- **ID**
The number which Application assigns automatically.
- **Plant Name**
Input the Plant Name. Maximum memory is 30byte

Tap the Keyboard button to display Keyboard.

Tap again to delete keyboard after the input of letter.



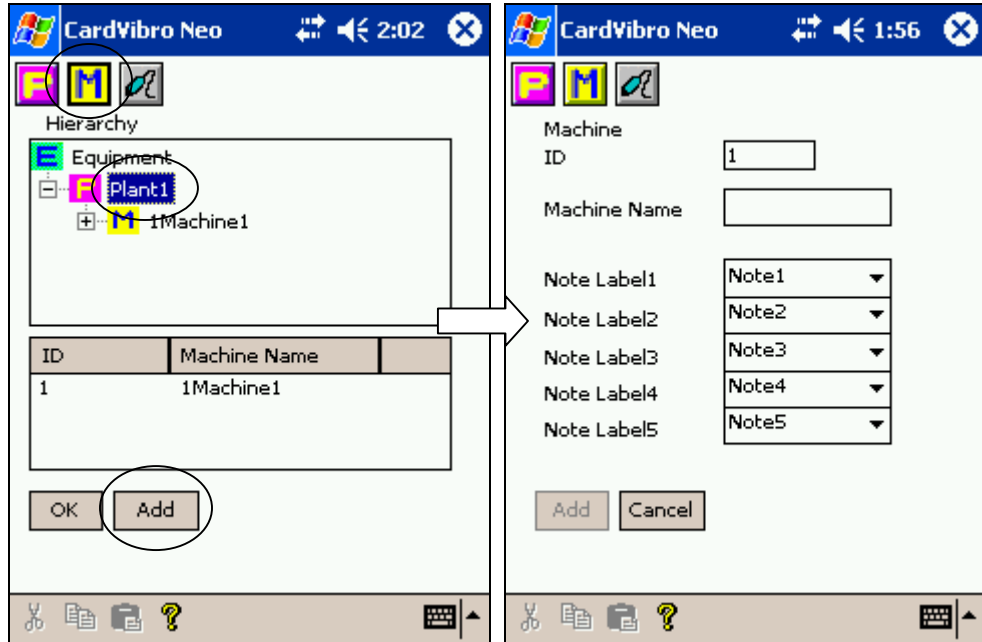
Tap the **Add button** to add.

!Information: Once it is added, the change or delete is impossible on Pocket PC. Please take care when registered.

Addition of Machine

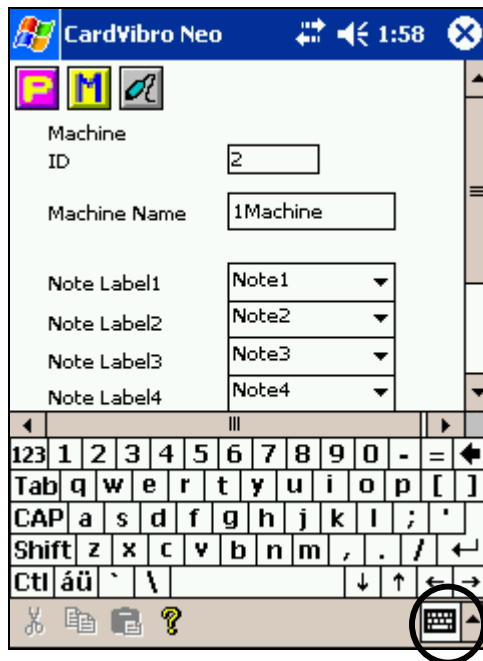
Tap the Machine button.

Select the **Plant icon** which the adding machine belongs and tap the **Add button** to display the Machine addition screen.



- **ID**
It is the number which Application assigns automatically.
- **Machine Name**
Input the Machine Name. Maximum memory is 30byte.
- **Note Label 1~5**
Select the item of the **Machine Note** to be controlled.
Select the Note Label among Note 1~5,RPM,TEMPERATURE,PRESSURE,VOLT,WATT.
CURRENT, FLOWMETER etc.

Tap the Keyboard button to display Keyboard.
Tap again to delete keyboard after input of letter.



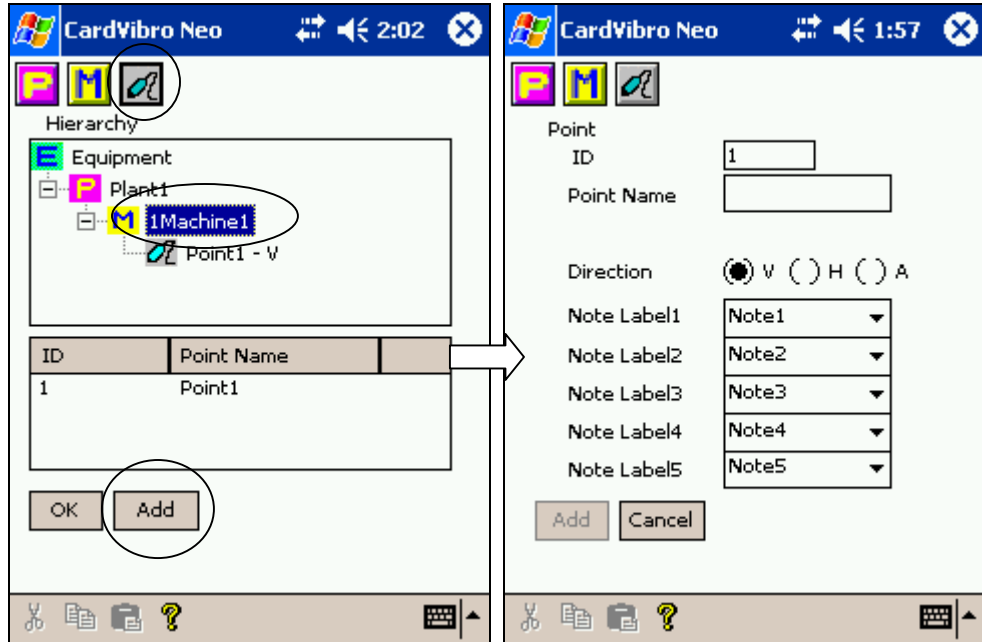
Tap the **Add button** to add.

!Information: Once it is added, the change or delete is impossible on Pocket PC. Please take care when registered.

Addition of Point

Tap the Point button.

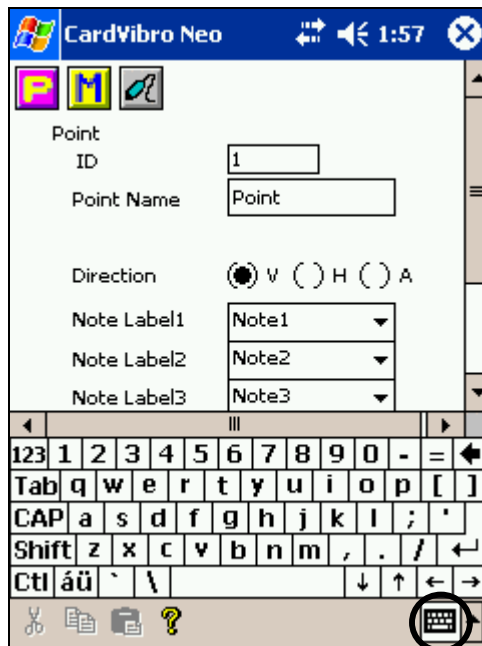
Select the **Machine icon** which the adding point belongs and tap the **Add button** to display the Point addition screen.



- **ID**
It is the number which Application assigns automatically.
- **Point Name**
Input the measuring point name. Maximum memory is 30byte.
- **Direction**
Select the detecting direction. **V**: Vertical, **H**: Horizontal, **A**: Axial
- **Note Label 1~5**
Select the item of **Point Note** to be controlled.
Select the Note Label among Note1~5,RPM,TEMPERATURE,PRESSURE,VOLT, WATT,CURRENT,FLOWMETER etc.

Tap Keyboard button to display Keyboard.

Tap again to delete keyboard after the input of letter.



Tap the **Add button** to add.

!Information: Once it is added, the change or delete is impossible on Pocket PC. Please take care when registered.

Save Data

Displays the **Save Data List** screen. All saved measurements are listed sequentially in the CardVibro Neo's **Save Data List**. From the **Saved Data List**, you can re-display the saved data.

Save Data Screen

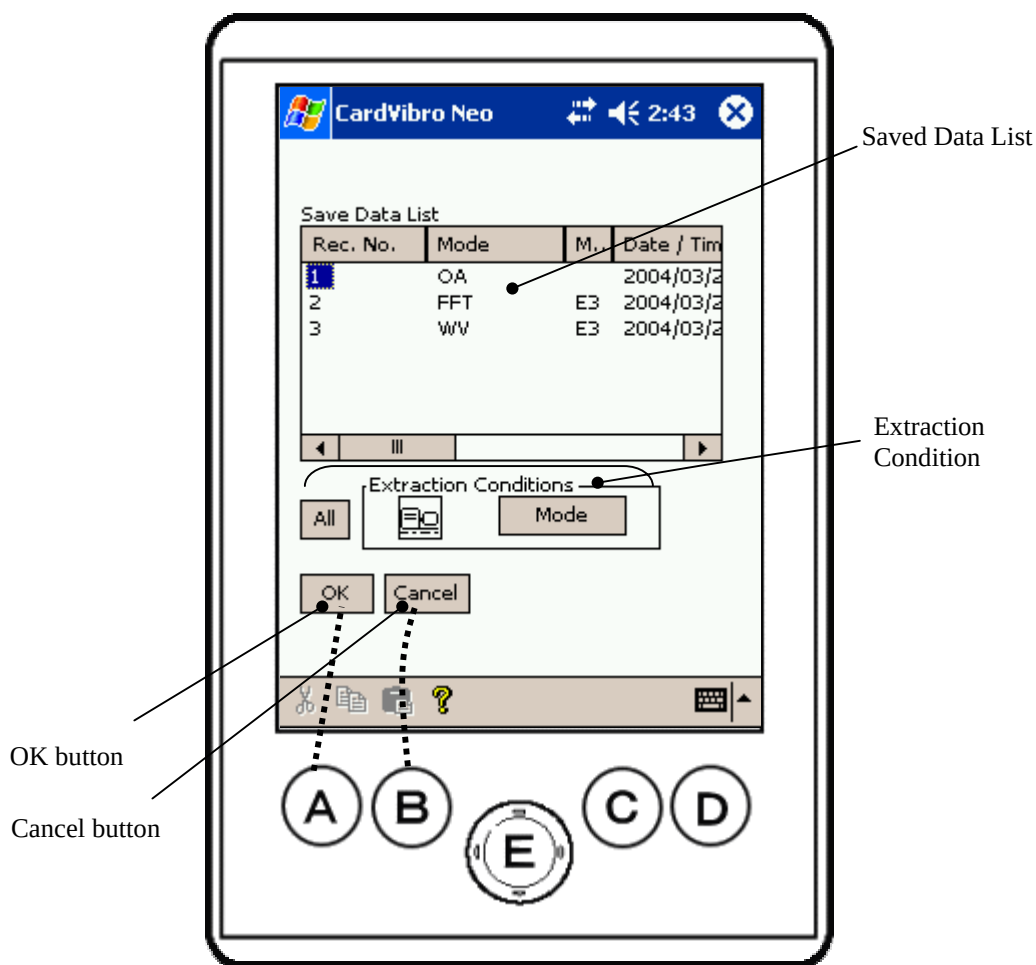


Fig:Save Data screen

[Display Item]

- **Save Data list**
For each saved measurement, the Save Data List displays the measurement's Rec. No, Mode, Meas. Type, Date / Time, Machine Name, Point Name, and Direction.
- **Extraction Condition**
Specifies the Point List and the Meas. Mode to set the extract condition.
- **OK button**
Tap to display the **Save Data** selected by the Save Data List.
- **Cancel button**
Tap to return to the Utilities Menu screen.

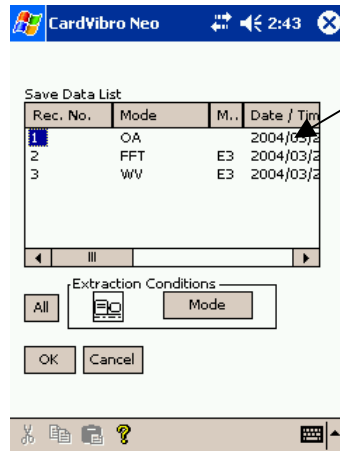
[Function of hard key button]

A button :Tap to display the **Save Data** selected by the Save Data List (OK button)

B button :Tap to return to the Utilities Menu screen. (Cancel button)

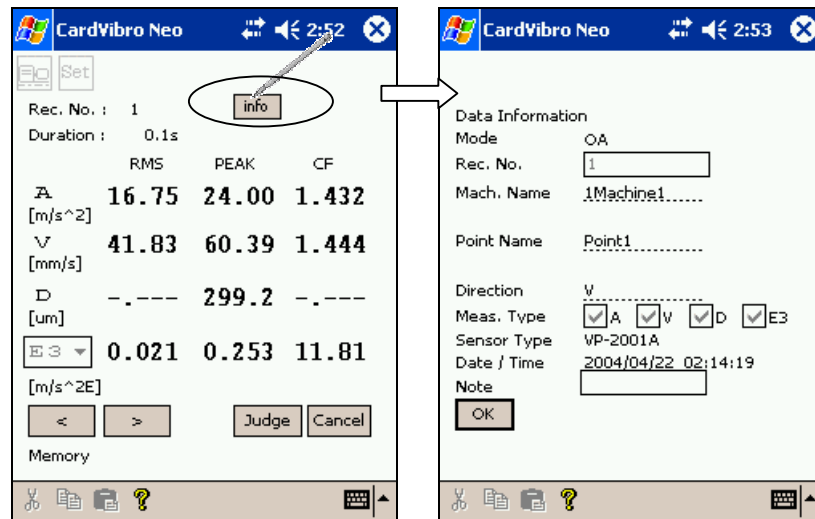
To re-display the saved data

- Use scroll bars to view data not displayed on the screen.



To select a measurement from the Save Data List:

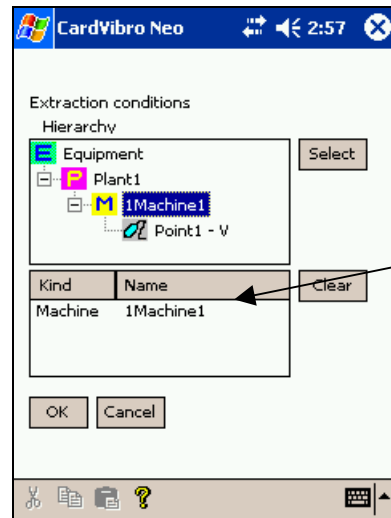
- Tap to highlight any of the measurement's fields (Rec. No., Mode, etc.).
With a measurement selected, use **OK button** to display the saved measurement data.



- Tap the **>** or **<** buttons to scroll forward and backward the measurement data screen.
- Tap the **info** button to display the **Data Information**.
- Tap the cancel button to return to the Save Data screen.

Save Data List operations include:

Search – Use the **extract condition** button to search for the specific **measuring Point** or **Meas Kind**.

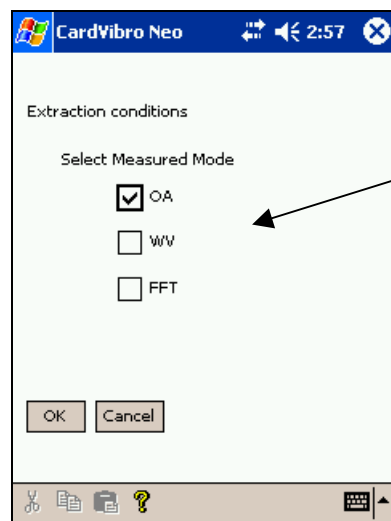


Select and tap Plant, Machine or Point icon on hierarchy. And press **Select** button to display **the selected point**.

Selected point

Kind: Plant, Machine or Point

When **OK** button is tapped, the selected point is extracted.



Check the Measured Mode to re-display.

When **OK** button is tapped, the selected **Meas. Mode** is extracted.

Accel fmax

Sets fmax for acceleration (A) overall vibration (the measurement upper frequency limit).

➤ FFT & WV measurements provide an fmax setting.

- Tap the **Utilities Menu's Accel fmax** button to display the **Definition of LPF of ACC A** screen.
- You may either select the frequency from the drop down list (1,000 Hz - 20,000 Hz). Defaults to 15,000 Hz.

Accel fmaxScreen

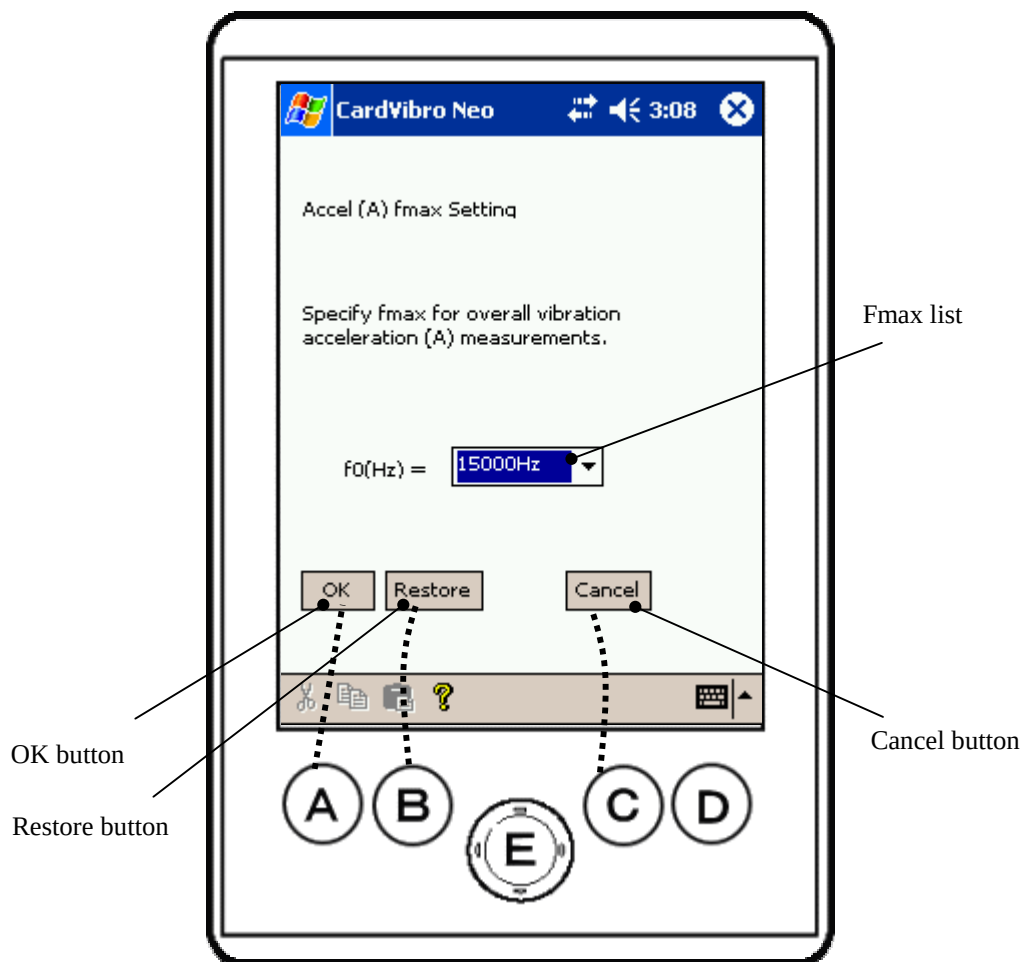


Fig:Accel fmaxscreen

[Display Item]

- **Fmax list**
You may either select the frequency from the drop down list (1,000 Hz - 20,000 Hz). Defaults to 15,000 Hz.
- **OK button**
Tap to confirm the changed content and returns to the Utilities Menu screen.
- **Restore button**
Tap to return to the default value of 15,000Hz.
- **Cancel button**
Tap to return to the Utilities Menu screen without save.

[Function of hard key button]

- | | |
|----------|--|
| A button | :Confirms the changed content and returns to the Utilities Menu screen (OK button) |
| B button | :Returns to the default value of 15,000Hz. (Restore button) |
| C button | :Returns to the Utilities Menu screen without save. (Cancel button) |

Database

Sets the folder path to save the Database file and the Wavefile.

Database Screen

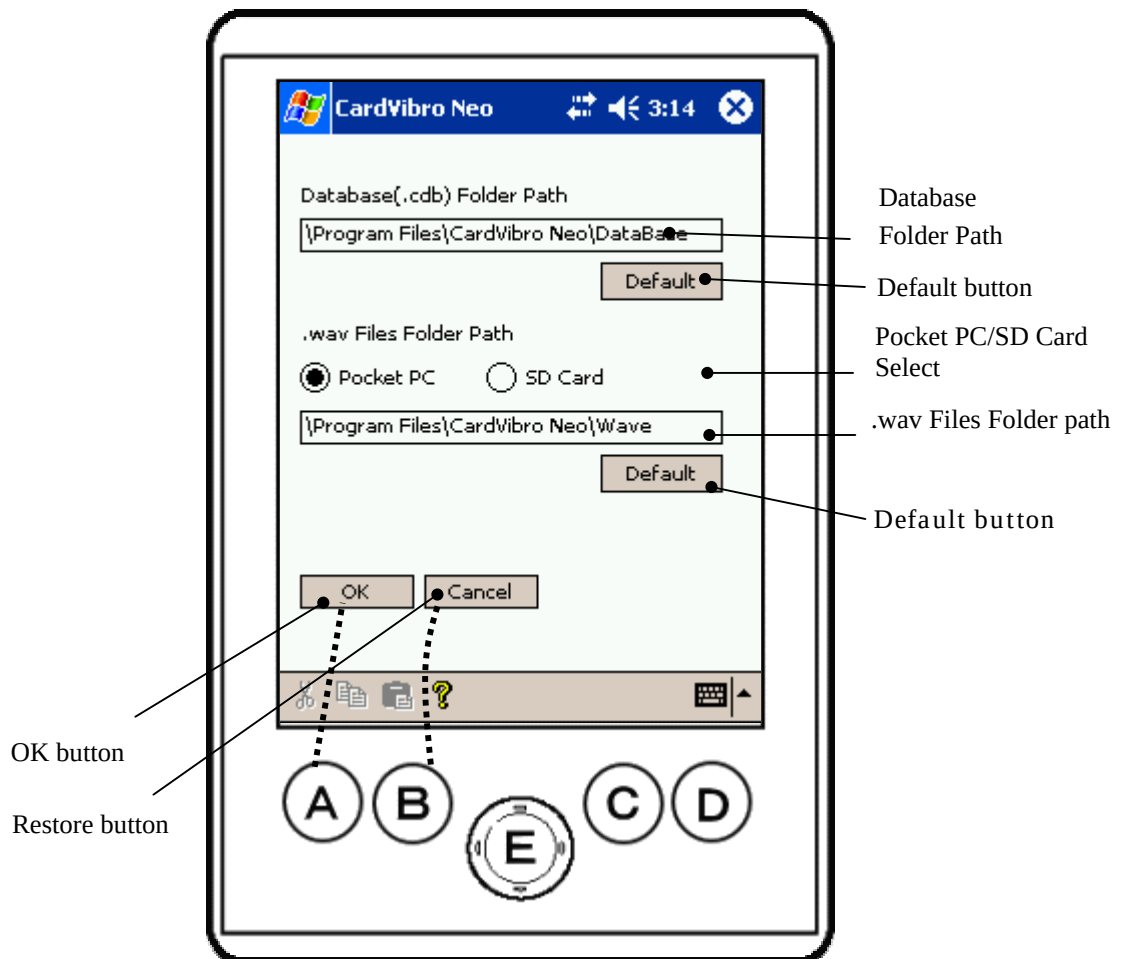


Fig:Database screen

[Display Item]

- **Database Folder Path**

Sets the folder path where database file cvndb1.cdb is saved.

Defaults to /Program Files/CardVibro Neo/DataBase.

Example: /My Documents

- **Default button**

Tap to return the Database folder path to /Program Files/CardVibro Neo/DataBase.

- **Pocket PC/SD Card Memory Select**

Selects either Main Memory of Pocket PC or SD Card Memory to save Wave file.

- **.wav Files Folder Path**

Set the folder path where the Wave files are saved.

Defaults to /Program Files/CardVibro Neo/Wave.

Example: /My Documents

/Storage Card/CardVibro Neo/Wave

- **Default button**

Tap to return the Wave file folder path to /Program Files/CardVibro Neo/Wave.

[Function of hard key button]

A button :Confirms the changed contents and returns to the Utilities Menu screen.
(OK button)

B button :Returns to the Utilities Menu screen without save (Cancel button)

Units

Displays the **Meas. Unit** Screen allowing you to specify either **Metric** or **English** vibration measurement units. Default to Metric and m/s².

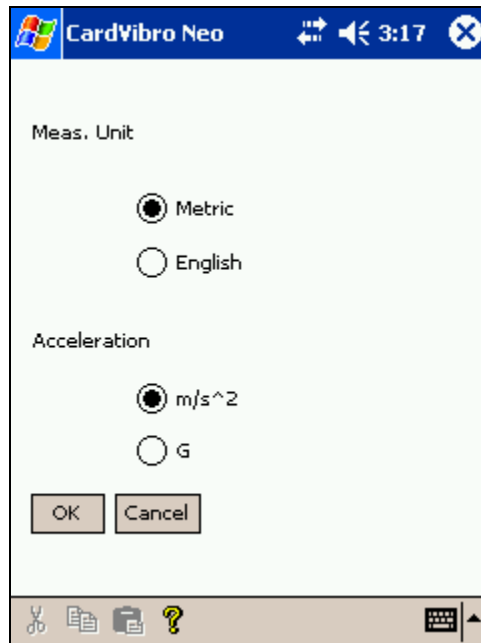


Fig:Unit Setting screen

[Display Item]

- **OK button**
Confirms the changed content and returns to the Utilities Menu screen.
- **Cancel button**
Tap to return to the Utilities Menu screen.

[Function of hard key button]

- | | |
|----------|---|
| A button | :Confirms the changed contents and returns to the Utilities Menu screen (OK button) |
| B button | :Returns to the Utilities Menu screen without save (Cancel button) |

Dictionary

Displays a dictionary of vibration terms.

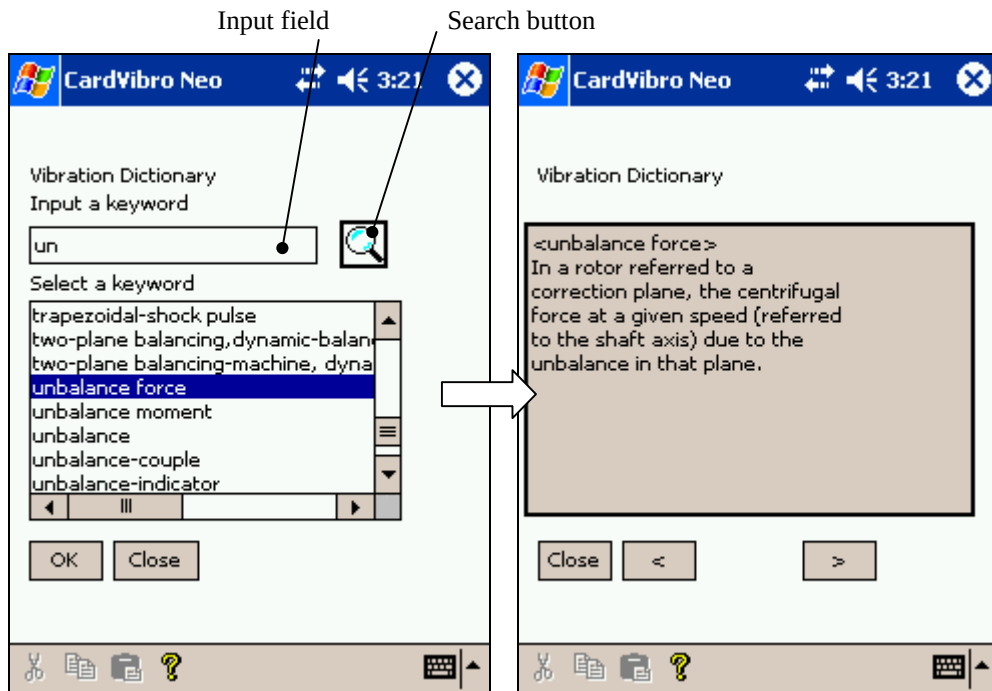


Fig:Vibration Dictionary screen

To search the dictionary for a specific term:

- Tap the **Utilities Menu's Dictionary** button.
- Tap to activate the input field to the lower right.
- Use the Pocket PC's on-screen keyboard to enter the keyword for the topic you wish to display and tap **Search** button. The dictionary displays the matching item(s).
 - To quickly browse through available topics, enter the first letter of the topic you wish to explore. All topics beginning with your entered letter display.

To sequence forward or backward through the dictionary.

- Tap the or buttons to scroll up and down the screen.

Version

Displays the CardVibro Neo version number.

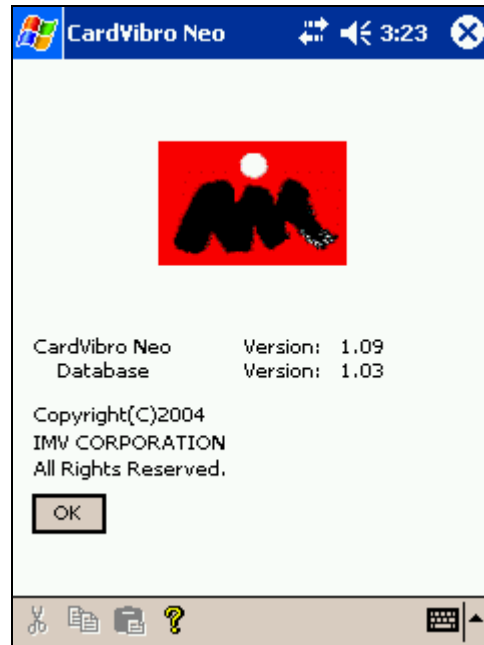


Fig:Version screen

About Installation of CardVibro Neo

Following files are saved in Pocket PC.

- CardVibro Neo is installed in the folder of **My Device/Program Files/CardVibro Neo**. Main files to be installed will be described as below.

Folder name & File name	Contents
/Program Files/CardVibro Neo	Folder name
└ CardVibro Neo.exe	.exe file of CardVibro Neo Software
└ cvndb2.cdb	Filter Information Database
└ abs.dll	.dll file of CardVibro Neo Software
└ crdvbr.dll	.dll file of CardVibro Neo Software
└ dsp.dll	.dll file of CardVibro Neo Software
└ fftc.dll	.dll file of CardVibro Neo Software
└ iir1.dll	.dll file of CardVibro Neo Software
└ iir2.dll	.dll file of CardVibro Neo Software
└ notch.dll	.dll file of CardVibro Neo Software
└ rms.dll	.dll file of CardVibro Neo Software
└ sin.dll	.dll file of CardVibro Neo Software
└ wndw.dll	.dll file of CardVibro Neo Software
└ Dictionary(Eng).TXT	Vibration Dictionary .txt file
└ Database	Folder name
└ cvndb1.cdb	Measured Data is saved in this Database file
└ Wave	Folder to save .wav file.
└ .wav files	Waveform files
└ New_DB	Folder name
	(New Database [empty Database] is saved.)
└ cvndb1.cdb *1	New Database [Empty Database]

Folder name & File name	Contents
/Windows	Folder name
└adoce31.dll	.dll file used with CardVibro Neo
└adocedb30.dll	.dll file used with CardVibro Neo
└adocedb31.dll	.dll file used with CardVibro Neo
└adoceoledb31.dll	.dll file used with CardVibro Neo
└adosync.dll	.dll file used with CardVibro Neo
└adosyncstub.dll	.dll file used with CardVibro Neo
└adoxce31.dll	.dll file used with CardVibro Neo
└crdvbrd.dll	Driver file of CardVibro Neo
└fileosp.dll	.dll file used with CardVibro Neo
└msdadc.dll	.dll file used with CardVibro Neo
└msdaer.dll	.dll file used with CardVibro Neo
└msdaeren.dll	.dll file used with CardVibro Neo
└msdaerjp.dll	.dll file used with CardVibro Neo
└msdaosp.dll	.dll file used with CardVibro Neo

There are files which application makes automatically other than above files.

*1: Spare new empty Database file. In case to make database newly, copy this file and use.

Troubleshooting

Troubleshooting

Pocket PC does not respond.

- Charge with the Pocket PC's battery.
- Remove the CardVibro Neo and attempt to turn on power.
- Push the reset button using the tip of a paper clip.
 - Please refer to the User manual of Pocket PC for a detailed handling explanation of Pocket PC.

CardVibro Neo does not operate when inserted into Pocket PC Unit

The message of “No communication with card.” is displayed.

- Check whether card & pickup are connected with Pocket PC correctly

Abnormal Measured Value (Too Low or Over Range)

- Too low of a measurement or an over range measurement both result in the same error indicator.
- Ensure the pickup cable's modular connector is inserted correctly.
- Ensure the pickup in use matches the pickup specified in the **Utilities Menu's Sensor Sensitivity Setting**.
- Ensure the Sensor sensitivity is set to the correct value.

Specifications

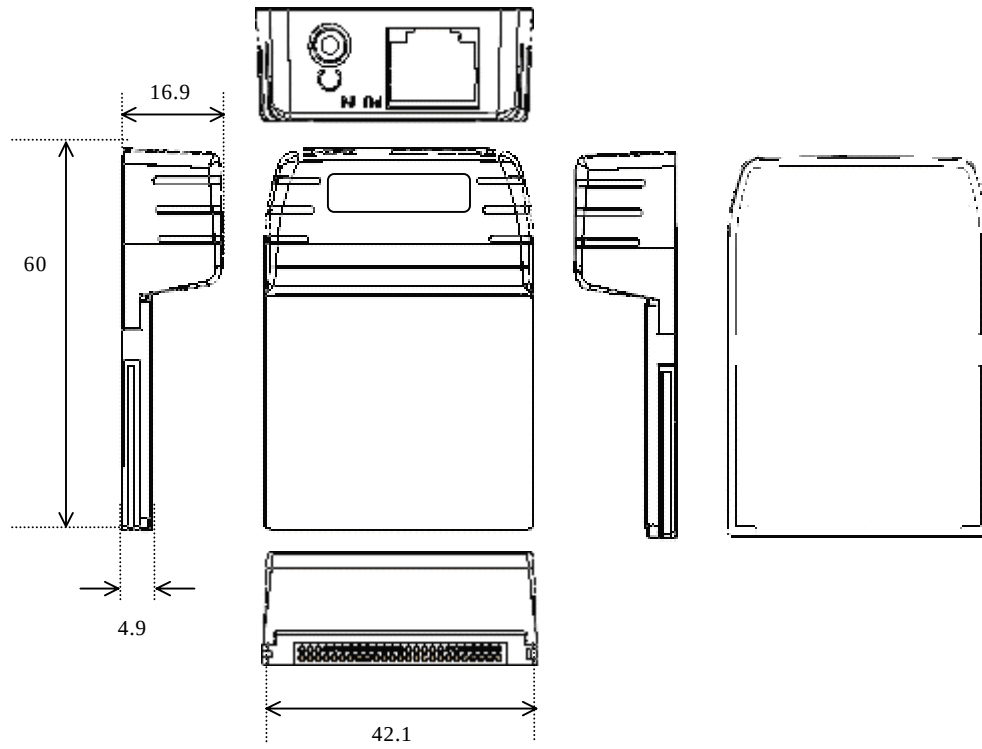
General Specification

Item	Specifications
Suitable Pocket PC *	OS : Windows Mobile™ 2003 software for Pocket PC Processor : ARM Processor : PXA255 400MHz(or more than) Memory(RAM): 64MB or more
Interface with Pocket PC	CF card with Type II slot
Power supply	+3.3V (It is supplied from Pocket PC.)
Temperature Range	0 ~ + 45° C
Humidity Range	30 ~ 90% RH not due condensation
Weight • Dimensions	25 g approx. (Only the card)•60.0x42.1x16.9 (mm), See below figure
Shape	Conforms to CF Card TYPE II ,Card Type
Color	Black
Pickup Input (PU IN)	AC voltage signal Max±2.5V Input Terminal: 8-pin modular jack(RJ-45)
Raw Waveform Output (PU OUT)	AC voltage signal Max±2.5V Outputs the voltage signal which the sensor input signal is amplified by the used range magnification (x1/x5/x20/x100) Output Terminal: 2.5φ mini-jack
Sampling Frequency	MAX. 76.8kHz (Changes according to Mode.) 76.8kHz / 38.4kHz / 19.2kHz / 9.6kHz
Aliasing Filter	20kHz/2kHz (Changes according to Mode.)
A/D	16bit

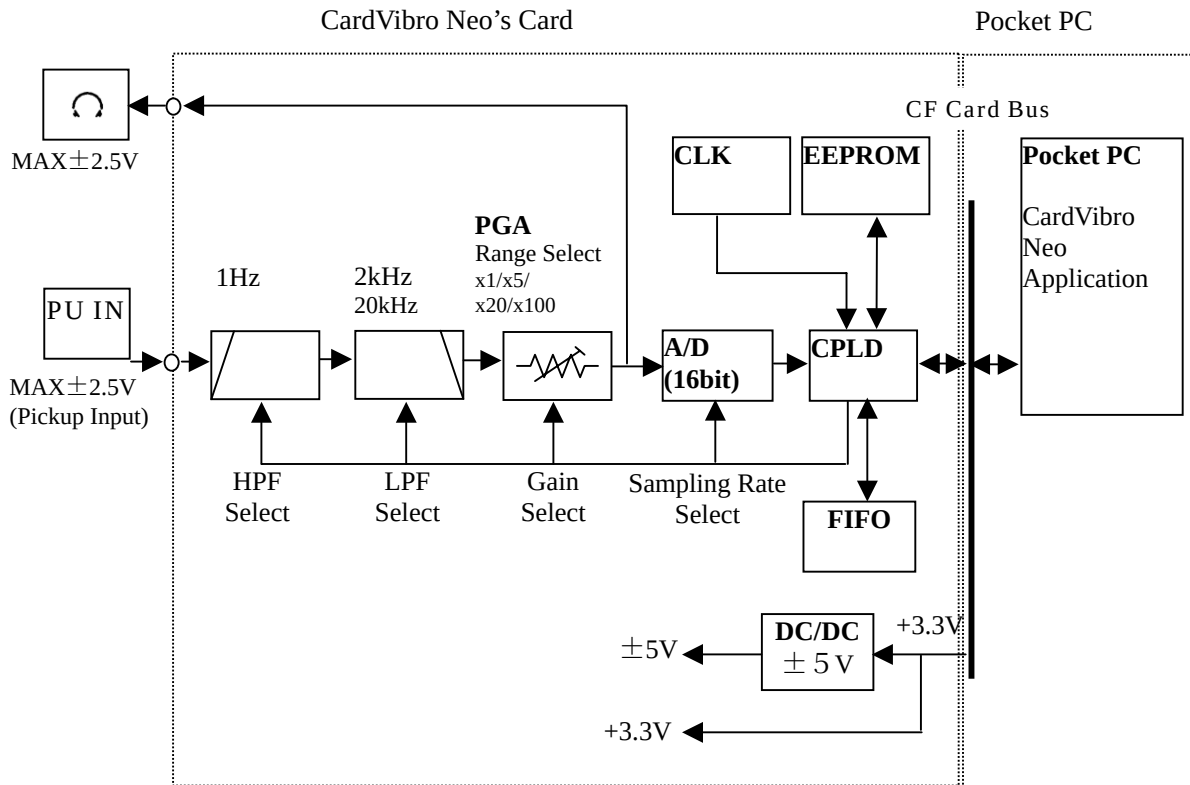
* Please consult IMV as for the available Pocket PC.

Item	Specifications
Overall Measurement	Select Simultaneous Meas./ Single Meas.
Judgment	○ISO Vibration Evaluation (ISO-10816[JIS-B-0906] standard) ○Bearing Evaluation
FFT Spectrum Analysis	○Lines of Resolution : Max. 1600lines ○Trigger function ○Dominant frequency component of highest 5 display function
Time Waveform Measurement	○Measuring Time : Max. 10 second ○Trigger function
Notes function	○Memo for every Machine,Measuring Point can be recorded. (Data of rotational number, temperature, power, pressure etc other than vibration can be saved.)
Data Save • Control	○Saves the information of machine name, measuring point, detected direction, note, measuring data, measuring condition etc in addition to the measured data. ○Pocket PC (memory 64MB) can save OA:2000 points, FFT:1000 points, WV:5MB (with the use of external memory as SD card, more data can be saved.)

- Dimensions



Block diagram of CardVibro Neo



CardVibro Neo Application
 Digital Signal Processing
 Overall Measurement
 Waveform & FFT Analysis
 Data storage

Measurement Specifications

VP-2001A is used

Item	Specifications
Frequency Range	
A	Acceleration 10~15kHz (*1)
V	Velocity 10~1kHz
D	Displacement 10~150Hz
E1	Enveloped Acceleration DC~50Hz(5~100Hz[BPF])
E2	Enveloped Acceleration DC~500Hz(50~1kHz[BPF])
E3	Enveloped Acceleration DC~5kHz(500~10kHz[BPF])
E4	Enveloped Acceleration DC~10kHz(5k~20kHz[BPF])
Measuring Range	Max. Acceleration 500m/s ²
Sampling Frequency	A,E3,E4: 76.8 kHz E1,E2,V,D: 38.4 kHz
Aliasing Filter	A, E3, E4: 20kHz E1, E2, V, D: 2kHz
Range	
A,E1,E2,E3,E4	0~ 10m/s ² (x100 range) 0~ 50m/s ² (x20 range) 0~ 200m/s ² (x5 range) 0~1000m/s ² (x1 range)
V	0~ 10mm/s (x100 range) 0~ 50 mm/s (x20 range) 0~ 200 mm/s (x5 range) 0~1000 mm/s (x1 range)
D	0~ 50 μ m (x100 range) 0~ 250 μ m (x20 range) 0~1000 μ m (x5 range) 0~5000 μ m (x1 range)

*1: The upper bound frequency can be changed by Utilities Menu's A ccel fmax.

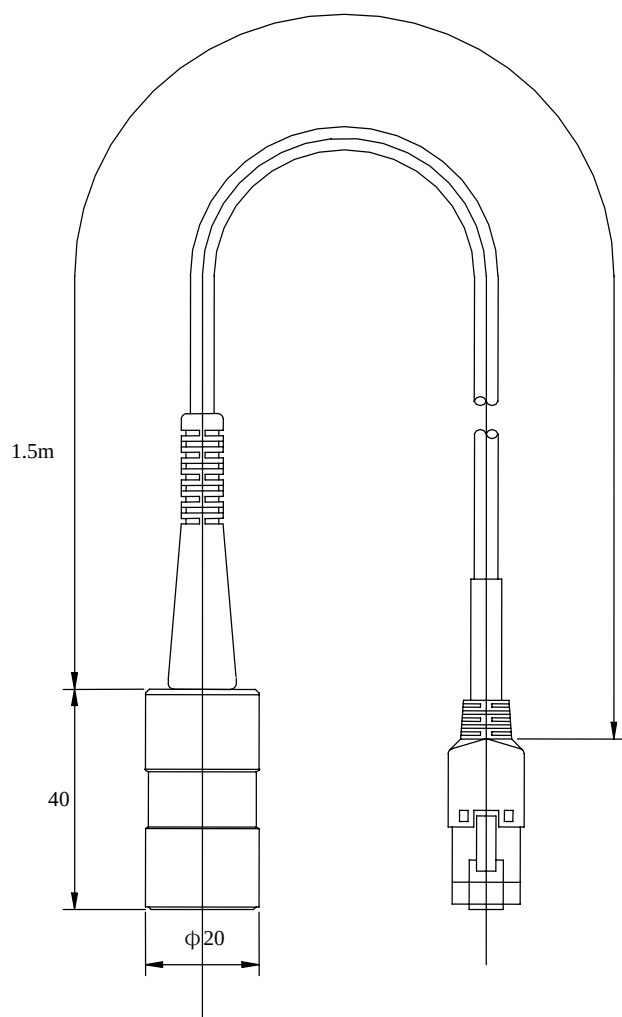
Item	Specifications
Overall Value Simultaneous measurement	Simultaneous measurement of overall vibration level, multi-meas. type (A, V, D, E1~E4) Range = Auto Measuring time = 0.1s/0.5s/1.0s Measurement Data = RMS value, PEAK value, C.F value Measured value display digit : Significant figure 4digit Ex.9999/999.9/99.99/9.999
Judgment	Status display (under measurement, measurement end) Abnormal judgment by vibration severity standard (ISO-10816 [JIS-B-0906] standard) Abnormal bearing judgment by Enveloped Acceleration E3 mode

Item	Specifications
FFT, Waveform Analysis	Meas. Type = A/V/D/E1/E2/E3/E4 Full Scale (Range) = Fixed/Auto FFT measurement condition Analysis frequency : Selectable list A :250/500/1k/2k/5k/10k/15k/30k Hz V :250/500/1k Hz D :250 Hz E1:50 Hz E2:250/500 Hz E3:250/500/1k/2k/5k Hz E4:250/500/1k/2k/5k/10k Hz Lines of Resolution : 1600/800/400 Averaging : Stable/ Exponential/ Peak Hold 1/2/4/8 times Window: Hanning/Rectangular/Flat Top Measured Type : Normal/Recorder/Post Process Measured Type: Normal type: Recording time of waveform data is determined by FFT measurement condition (analysis frequency, line number). Executes the measurement for average cycle in FFT and records the waveform for frame time (final frame time.) Recorder type: Records the waveform of specified time by Rec.time. Average cycle of FFT is 1-time. (but it is impossible to specify the FFT measurement condition which the specified Rec.time is less than frame time.) Rec.Time:1/2/5/10 sec PostProcess type: Calculates from the just before raw waveform data (temporary saved data). Average cycle of FFT is 1-time. Range setting and trigger function is unavailable. Trigger Function Trigger: Input signal trigger Trigger level :0/10/20/30/40/50/60/70/80/90 % Specify % of the used range Delay :0/10/20/30/40/50 % Specify % of the specified waveform measurement time Status Display: During measurement, Measurement end
Graph Display	FFT graph Dominant frequency component highest High5 display Cursor indication value display Zoom scroll value display Waveform graph Cursor indication display Zoom.scroll display

VP-2001A- Accelerometer

Item	Specifications
Detecting Method	Pre-amp is built-in. Compression type, shear type
Power Supply	DC $\pm$ 5V
Voltage Sensitivity	2.0 mV/m/s ²
Resonance Frequency	20 kHz approx.
Frequency Range	3 ~ 10,000 Hz
Max. Acceleration	500 m/s ²
Max. Allowable Acceleration	5000 m/s ²
Max. Output Voltage	$\pm$ 1 V
Output Impedance	Below 100 Ω
Used Temperature	$\sim$ 20° ~ 80° C
Material	SUS
Weight	60 g approx.
Mounting Screw	M6, P=1, depth 5, internal thread *
Cable	Direct leading ϕ 4, 1.5 m
Connector	8-pin modular plug
Dimensions	See next page
Structure	Dust-proof, spray-proof

VP-2001A- Dimensions



When VP-2001V is used

Item	Specifications
Frequency Range V D	Velocity 10~1000Hz Displacement 10~500Hz
Measuring Range	Max. Displacement 1000μmp-p
Sampling Frequency	V, D: 38.4 kHz
Aliasing Filter	V, D: 2kHz
Range V D	0~ 5mm/s (x100 Range) 0~ 25 mm/s (x 20 Range) 0~ 100 mm/s (x 5 Range) 0~ 500 mm/s (x 1 Range) 0~ 25 μ m (x100 Range) 0~ 125 μ m (x 20 Range) 0~ 500 μ m (x 5 Range) 0~2500 μ m (x 1 Range)
Overall Value Simultaneous measurement	Simultaneous measurement of overall vibration level, multi-meas. type (V, D) Range = Auto Measuring time = 0.1s/0.5s/1.0s Measurement Data = RMS value, PEAK value, C.F value Measured value display digit : Significant figure 4digit Ex.9999/999.9/99.99/9.999
Judgment	Status display (under measurement, measurement end) Abnormal judgment by vibration severity standard (ISO-10816 [JIS-B-0906] standard)

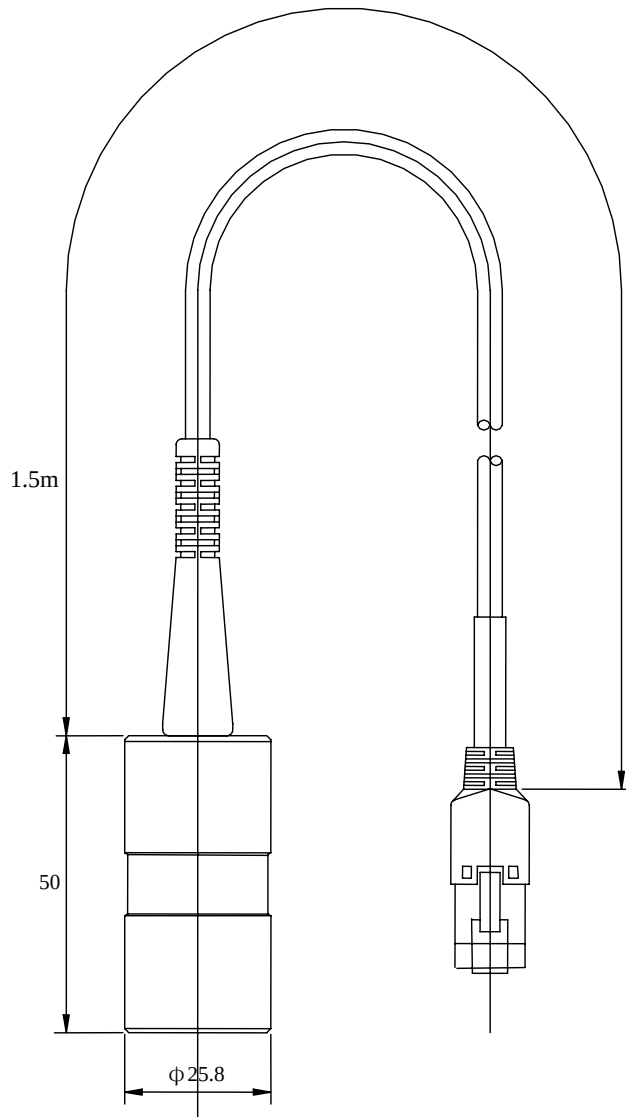
Item	Specifications
FFT, Waveform Analysis	Meas. Type = V/D Range = Fixed/Auto FFT measurement condition Analysis frequency : Selectable list V :250/500/1k Hz D :250/500 Hz Lines of Resolution : 1600/800/400 Averaging : Stable/ Exponential/ Peak Hold 1/2/4/8 times Window: Hanning/Rectangular/Flat Top Measured type: Normal/Recorder/Post Process Measured type: Normal type : Recording time of waveform data is determined by FFT measurement condition (analysis frequency, line number). Executes the measurement for average cycle in FFT and records the waveform for frame time (final frame time.) Recorder type: Records the waveform of specified time by Rec.time. Average cycle of FFT is 1-time. (but it is impossible to specify the FFT measurement condition which the specified Rec.time is less than frame time.) Rec.Time:1/2/5/10 sec PostProcess type: Calculates from the just before raw waveform data (temporary saved data). Average cycle of FFT is 1-time. Range setting and trigger function is unavailable. Trigger Function Trigger: Input signal trigger Trigger level :0/10/20/30/40/50/60/70/80/90 % Specify % of the used range Delay :0/10/20/30/40/50 % Specify % of the specified waveform measurement time Status Display: During measurement, Measurement end
Graph Display	FFT graph Dominant frequency component highest High5 display Cursor indication value display Zoom scroll display Waveform graph Cursor indication value display Zoom.scroll display

VP-2001V - Velocity Sensor

Specifications

Item	Specifications
Detecting Method	Electro-dynamic velocity pickup
Detecting Direction	Horizontal or Vertical
Voltage Sensitivity	4.0 [mV/(mm/s)]
Natural Frequency	14 Hz
Frequency Range	10 ~ 1000 Hz
Max. Tolerable Acceleration	100 m/s ²
Max. Measuring Displacement	1000 μmP-P
Usable Temperature	-10~50 C
Material (case)	SUS
Weight	140 g approx.
Mounting Screw	M6,P=1,depth, 5、 internal thread
Cable	Direct leading φ 4, 1.5 m
Connector	8-pin modular plug
Dimensions	See next page
Structure	Dust-proof, spray-proof

VP-2001V - Dimensions



VP-2001PS is used

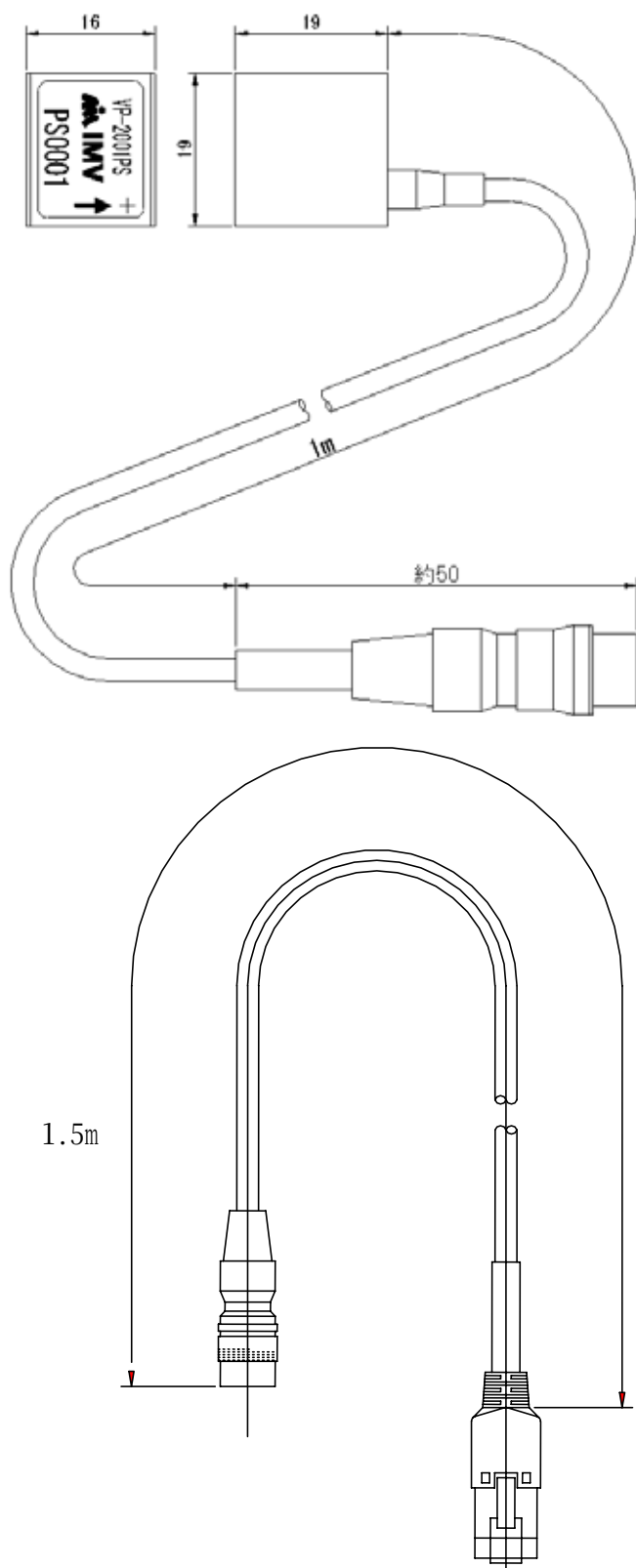
Item	Specifications
Frequency Range	
A	Acceleration 3~100Hz
V	Velocity 3~100Hz
D	Displacement 3~100Hz
Measuring Range	Max. Acceleration 20m/s ²
Sampling Frequency	A,V,D: 9.6 kHz
Aliasing Filter	A,V,D: 2kHz
Range	
A	0~ 0.2m/s ² (x100 range) 0~ 1m/s ² (x20 range) 0~ 4m/s ² (x5 range) 0~ 20m/s ² (x1 range)
V	0~ 1mm/s (x100 range) 0~ 5 mm/s (x20 range) 0~ 20 mm/s (x5 range) 0~ 100 mm/s (x1 range)
D	0~ 5 μ m (x100 range) 0~ 25 μ m (x20 range) 0~100 μ m (x5 range) 0~500 μ m (x1 range)
Overall Value Simultaneous measurement	Simultaneous measurement of overall vibration level, multi-meas. type (A, V, D) Range = Auto Measuring time = 1s/5s/10s Measurement Data = RMS value, PEAK value, C.F value Measured value display digit : Significant figure 4digit Ex.9999/999.9/99.99/9.999 Status display (under measurement, measurement end)

Item	Specifications
FFT, Waveform Analysis	Meas. Type = A/V/D Full Scale (Range) = Fixed/Auto FFT measurement condition Analysis frequency : Selectable list A :125 Hz V :125 Hz D :125 Hz Lines of Resolution : 400 Averaging : Stable/ Exponential/ Peak Hold 1/2/4/8 times Window: Hanning/Rectangular/Flat Top Measured Type : Normal/Recorder/Post Process Measured Type: Normal type: Recording time of waveform data is determined by FFT measurement condition (analysis frequency, line number). Executes the measurement for average cycle in FFT and records the waveform for frame time (final frame time.) Recorder type: Records the waveform of specified time by Rec.time. Average cycle of FFT is 1-time. (but it is impossible to specify the FFT measurement condition which the specified Rec.time is less than frame time.) Rec.Time:1/2/5/10 sec PostProcess type: Calculates from the just before raw waveform data (temporary saved data). Average cycle of FFT is 1-time. Range setting and trigger function is unavailable. Trigger Function Trigger: Input signal trigger Trigger level :0/10/20/30/40/50/60/70/80/90 % Specify % of the used range Delay :0/10/20/30/40/50 % Specify % of the specified waveform measurement time Status Display: During measurement, Measurement end
Graph Display	FFT graph Dominant frequency component highest High5 display Cursor indication value display Zoom scroll value display Waveform graph Cursor indication display Zoom.scroll display

VP-2001PS – Piezo-resistive Acceleration Pickup

Item	Specifications
Measuring Range	$\pm 20\text{m/s}^2$
Sensitivity	$102\text{mV/m/s}^2 \pm 5\%$
Linearity	$\pm 0.5\%$
Frequency Range	$1 \sim 100\text{Hz}$ ($\pm 0.5\text{dB}$)
Resolution	$\leq 0.06 \text{ m/s}^2$
Temperature Characteristic(Sensitivity)	$\leq 0.2\%/^{\circ}\text{C}$
Zero-point drift	$\leq 6\text{mV}/^{\circ}\text{C}$
Power Voltage	$\pm 5\text{V} \sim \pm 15\text{V}$
Temperature Range	$0 \sim 50^{\circ}\text{C}$
Weight	36 g
Shock Resistance	4000m/s^2
Dimensions	$19 \times 19 \times 16 \text{ mm}$
Cable	Total length 2.5m (Direct leading cable 1m + Relay cable 1.5m)

VP-2001PS - Dimensions



Vibration Evaluation Standard

Vibration Evaluation Standard

Evaluation Standard	Sensor / Pickup		Measurement Type
ISO Vibration Evaluation Standard (Vibration Severity)	Accelerometer (VP-2001A)	Electro-dynamic Velocity Pickup (VP-2001V)	Vibration level (OA value*) measurement Velocity (V) value
Bearing Evaluation	Accelerometer (VP-2001A)		Vibration level (OA value) measurement Enveloped Acc. (E3)

* OA value: Over All value

ISO Vibration Evaluation Standard – Vibration Evaluation Standard by Vibration Severity

Vibration evaluation standard for machine operating with rotational speed between 600 ~12,000 RPM. The standard vibration is the vibration generating on machine surface or bearing. The frequency range is limited to 10 ~1,000 Hz.

ISO B 0906-1989: Vibration evaluation standard for machine with rotational speed ~200 r/s

ISO B 0907-1989: Required item for the measuring unit for vibration severity of rotational machine and reciprocal machine.

Appendix A Vibration Severity		Ranges of Vibration Severity		Example of quality judgment for separate classes of machine			
Class I	Small machine	Range	RMS-velocity (mm/s) at the range limits	Class I	Class II	Class III	Class IV
Class II	Medium size machine	0.28	0.28	A	A	A	A
		0.45	0.45				
Class III	Large machine	0.71	0.71	B	B	B	B
		1.12	1.12				
Class IV	Turbo machine	1.8	1.8	C	C	C	C
		2.8	2.8				
		4.5	4.5	D	D	D	D
		7.1	7.1				
		11.2	11.2	D	D	D	D
		18	18				
		28	28	D	D	D	D
		45	45				
		71	71				

Bearing Evaluation – for enveloped acceleration E3 measurement

General guidelines for setting enveloped acceleration measurement alarms for bearing monitoring were established using statistical analysis of existing databases.

The figures in this chart are provided as general guidelines only.

Your measurement trending experience best determines your severity levels.

About Classification

(a) Class1

bearing bore diameter

:Dia. between 200 and 500 mm

shaft speed

:Speed<500rpm

(b) Class2

bearing bore diameter

:Dia. between 50 and 300 mm

shaft speed

:Speed between 500 and 1800 rpm

(c) Class3

bearing bore diameter

:Dia. between 20 and 150 mm

shaft speed

:Speed is either 1800 or 3600 rpm

Vibration Severity		Shaft Diameter / Speed		
		Class1	Class2	Class3
Fmax 60,000 CPM 1000Hz		Dia.:200~500mm Speed<500RPM	Dia.:50~300mm 500<Speed<1800RPM	Dia.:20~150mm Speed:1800 or 3600RPM
E3 PEAK Value	0.1 [GE]	Good		
	0.5		Good	
	0.75	Satisfactory		Good
	1		Satisfactory	
	2	Alert		Satisfactory
	4		Alert	
	10	Danger		Alert
			Danger	Danger

1G=9.806m/s²

Other Product Information

FCC Statement

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Information to user:

Any changes or modifications without the express approval by the party responsible for compliance could void the user's authority to operate the equipment.

- This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.